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1925



*The Seventeenth Green, Hollywood Golf Club, Deal, N. J.
Stumpp & Walter Co.'s Grass Seed and Fertilizers have been used exclusively, and their advice followed, for the past nine years*

Golf Turf

of High Quality

GRASS *for* GOLF COURSES, TENNIS COURTS
POLO FIELDS *and* FINE LAWNS

HOW TO PRODUCE IT AND HOW TO TAKE CARE OF IT

Stumpp & Walter Co

30 and 32 Barclay Street

New York City

GOLF TURF—Fourth Edition

ONCE again it is our pleasure to bring before you our Annual, "Golf Turf," in the hope that it may prove interesting. We are ready to serve you in any of the following ways:

Grass Seeds of Highest Quality

We furnish Grass Seeds of the highest possible purity and vitality, botanically true. As specialists, supplying grass seeds for over twenty-five years, we submit that you may be assured of safety and reliability when purchasing your seed requirements from us.

You cannot see the quality in seeds; it is by results only that our merchandise can be judged; our wares are the raw materials, as it were; they are not purchased for immediate use but for the results that, with proper care and in the fullness of time, may reasonably be expected of them.

Every season gives us the opportunity of greeting new friends and customers, and it is our pleasure to take this occasion to assure them that our methods involve the most minute care in the production of seeds, a never-ending process of cleaning, re-cleaning, grading, and testing.

Quick Service in the Supply of Equipment

The central location of our well-equipped New York City warehouses, adjacent to railroad and steamship terminals, and our large organization of experienced employees enable us to supply a very wide selection of golf-course equipment with the utmost speed.

Advisory Service

We are prepared to assist with your turf problems; long and successful experience in the production and maintenance of turf warrants our offering this service. We are glad to give all possible help by mail, free of charge; or, at your request, we will confer with you on the ground and furnish you with detailed written recommendations as to the correct cultural practice, economical fertilizing where necessary, and correct seeding; our fee for this would cover actual traveling expense to and from New York only.

Skilled Foremen and Constructors

We are prepared to furnish the services of experienced foremen to take charge of renovation projects in a practical manner; remuneration on a weekly salary basis. On new projects we will, if desired, relieve you of much of the detail: we can put you in touch with reliable architects and later take charge of the actual work of construction.

Correspondence Invited

Our service is a complete one pertaining to the production of fine turf and its maintenance; we solicit your business and your inquiries. Both will receive prompt, individual, and careful attention.

Stumpp & Walter Co

30 and 32 Barclay Street

New York City

GEORGE G. STUMPP, *President*
JULIAN H. WALTER, *Treasurer*

THOMAS F. KEARNEY, *Asst. Treas.*
WILLIAM A. SPERLING, *Secretary*

Non-Warranty.—We, Stumpp & Walter Co., give no warranty, express or implied, as to description, quality, productiveness, or any other matter of any seeds, bulbs, or plants we send out, and will not be responsible for the crop.

As bearing on the above, the following remarks, taken from Bulletin No. 1232, issued October, 1921, by the U. S. Department of Agriculture, are of interest: "Without attempting to discuss the arguments for the seedsman's disclaimer pro and con, the fact remains that reputable seedsmen stand back of their seeds and do not knowingly and wilfully sell seeds that are unfit for planting purposes."

All claims must be made within five days after receipt of goods

Building a Golf Course



THE golf architect's work is usually finished when he has delivered his plans and blue prints and has staked out the greens and tees. Very often it is up to the committee to engage a contractor to carry out the architect's plans. Hence it is of interest to consider a golf course from the beginning, taking the period when the architect leaves and when the contractor arrives, to commence our story.

The contractor will be provided with the necessary teams or tractors, scoops, plows, scrapers, harrows, etc. Also it will probably be necessary for him to have men and materials for removing stumps and rocks. The contractor should be provided with very minute plans, drawn strictly to scale, and showing clearly all grading work, the location, shape, height, and contours of the greens, with the accurate location of the traps.

The most important point in all construction work is to *conserve all the top-soil*—do not permit grading or plowing to bury this most important material. The first thing after the fairways are located is, assuming that the time will permit, to sow a cover-crop: field peas if in early spring, cow-peas or soybeans in summer; rye and vetch if in the fall and to stand through the winter. The seeds

for the cover-crop having been sown, the land harrowed and rolled, the fairways may be left while attention is given to the greens.

The top-soil should be removed from these and the greens built in accordance with the ideas of the designer. It is usual to use subsoil or "fill" for constructing the foundation of the greens, but we have observed the best results where the rough has been skinned for top-soil and this top-soil used in the building of the green to a depth of several feet where necessary. The original top-soil may be spread evenly over the green, and on this from 5 to 10 tons of mushroom soil, humus, or rotted manure should be spread; then if the soil of the course is of a medium to heavy nature, 5 cubic yards of sand should be added, and the whole forked, harrowed, or scuffed until the earth comprising the green to a depth of 6 inches is an even mixture. About 150 pounds per green of Stumpp & Walter Co.'s Emerald Grass Fertilizer, may be dusted upon the surface, and the soil then thoroughly raked to bring it into that fine condition necessary for a suitable seed-bed.



Constructing one of the greens at the Nassau Country Club, L. I. Stumpp & Walter Co.'s seeds were used on this course

Many constructors at this point remove the top inch, inch and a half, or two inches of soil and pass it through a $\frac{1}{4}$ -inch rotary screen, then returning the screened soil to the surface of the green. This is actually profitable because it tends to produce finer turf more quickly. Another very desirable use for screened soil is to cover slightly newly sown seed by means of hand-sieves or riddles; in this method it is best to place boards alongside the green and to move these gradually across the green as the covering proceeds—the men walk on the boards rather than on the green while using the riddles. Roll when the work is completed.

In any case, care must be exercised to remove all sticks, stones, and other debris. It is a great advantage if, at this point, it is possible to "fallow" the finally prepared green to give weed seeds an opportunity to germinate. As they appear, the soil should be raked to destroy them.

The soil being prepared, and made as weed-free as possible the next thing is to sow suitable seed, or to plant stolons of Creeping Bent. For an average-size green, say 25 yards by 20 yards, on medium to heavy soil it is usual to sow 30 to 60 pounds of German Bent; on lighter land it is usual to sow 100 pounds or more per green of pure Chewing's Red Fescue of strong vitality, reduced slightly if the seeding is scheduled for the fall; at that time the new crop seed of Chewing's Fescue, showing a high germination, is usually available. Rather than seeding with only one variety, we prefer the use



A good idea. The architect has fashioned a small model of the new green out of the adjacent soil, enabling Constructor Bryce of the Brookville Club, L. I., to follow closely his ideas. Stumpp & Walter Co.'s seeds were used on this course.

Stump & Walter Co.'s GOLF TURF

Applying the fertilizer and preparing and spreading the final inch of screened soil on a putting-green at Brookville.

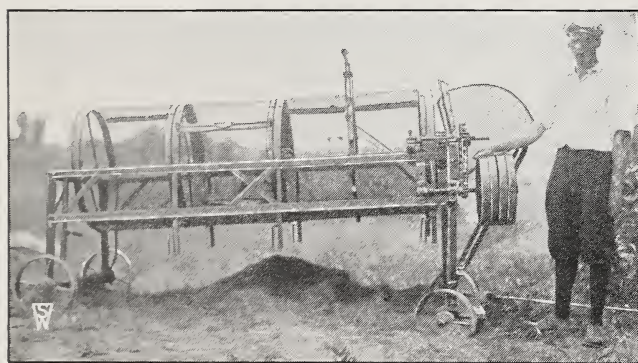


Note that the rake is reversed for best results when spreading



of mixed seeds, and on average-sized greens on medium to heavy land we recommend 75 to 100 pounds of our Special Putting-Green Bent Formula, and on lighter land the same quantity of Standard Putting-Green Mixture. An established green from a mixture of varieties gives a good turf quickly, one that is more uniform through the year and is less likely to suffer badly from extremes of climate or from attacks of fungus disease. The use of mixtures as against separate varieties has the practical support of many years' experience. If the green is to be planted with stolons, or "vegetated,"

By this time the fairways will be ready for attention. The growing cover-crop will be plowed under, so adjusting the plow that the land is thoroughly inverted and the plants covered, but taking care that, with this borne in mind, the plowing is as shallow as possible. Frequently it will be found that one or more lengths of heavy chain attached to the rear of the plow will assist in turning the green plants under. If there is any doubt as to the ability of the soil to carry a turf—the growth of the cover-crop is a very good indication of this, varying degrees of fertility in the soil showing in the luxuriant growth or otherwise of the cover-crop plants—rotted manure or mushroom soil should be spread over the plowed land at the rate of twenty tons per acre. A disc may then be run over the land, but with the plates so adjusted that they do a little more than cover the manure. The disc will then be followed by a smoothing-harrow, run across the necessary number of times to bring the land into fine "tilth." Prior to the last harrowing, 750 pounds per acre of Fairway Fertilizer may be applied; more to those areas which the poorer growth of the cover crop indicates are in need of additional fertilization.



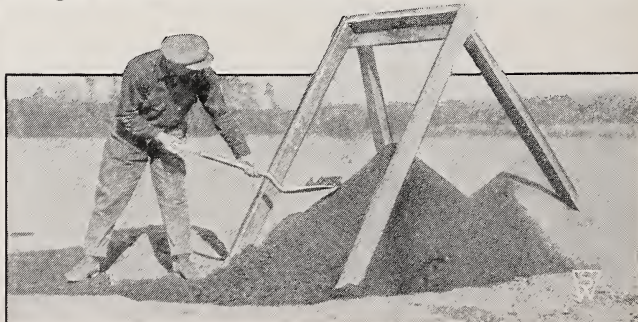
Type of rotary soil-screen of value in preparing the top inch of soil—the germinating layer—for putting-greens. Will screen up to 5 cubic yards per hour; cost is \$190, f.o.b. New York.

Fairway seed is best sown by means of a wheelbarrow seeder, several of which are listed on page 53. This should be followed by a bush-harrow, an easily made arrangement of branches and twigs held together with light lumber—two or three pieces of 2 by 4-inch boards would be suitable, but arranged so that the lumber does not come into contact with

as the process is sometimes described, 450 square feet of Creeping Bent stolon turf should be used.

With present values, to plant a green of this size with stolons costs \$135; to sow it with straight German Bent costs for seed about \$75; with straight Red Fescue, about \$50; with our Special Putting-Green Bent Formula about \$65; and with our Standard Putting-Green Mixture, about \$50; so the club's appropriation may have some bearing upon the question.

It is best to sow putting-greens by hand. After scattering the seed, a very light raking to place it just under the surface is necessary, and a rolling with a light roller completes the work.

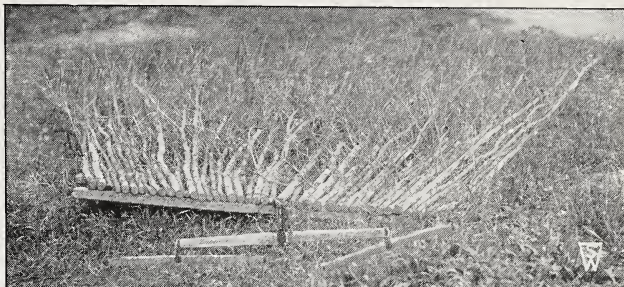


A much-used, but now somewhat obsolete, method of screening soil. Screens cost \$12 and \$14 each (two sizes)

the soil. A medium-weight horse roller drawn over the land completes the seeding. We advise using 200 pounds of seed per acre.

The seeding of tees is carried out on the same general principles as seeding greens, except that a coarser, harder-wearing type of grass is sown. To take care of this we offer a Special Mixture of Grass Seeds for Tees. Allow 1 pound to each 200 square feet.

If the foregoing recommendations are followed closely, one should obtain, as nearly as possible, 100 per cent success. Thin patches here and there, and even occasional bare places may occur on the newly seeded land; these should be watched for, and a light top-dressing with mixed seed and soil will take care of most of them. If any particularly stubborn patches are met with, the soil should be removed from them



A type of bush harrow as improvised on a New Jersey golf course. Birch branches are used

to a depth of 3 inches, fresh soil introduced and the area again top-dressed.

The After-Care of Newly Seeded Areas

When young grass is an inch high it is a good plan to encourage it by dusting over it lightly some compost and fertilizer mixed together. The effect of this is to stimulate the young plants at just the period when they benefit most. Use the fertilizer at the rate of 50 pounds per average size green, or on larger areas at the rate of 500 pounds per acre.

It is a mistake to delay cutting young grass. Just as soon as it is $1\frac{1}{2}$ inches long, a well-adjusted, well-oiled and

thoroughly sharp lawn mower should be run over it. The machine should be so adjusted that at first it no more than "tops" the grass; in two or three days it should be cut again, but with the machine adjusted a shade lower, and in this manner the grass should gradually be brought down to the required height.

Young grass is greatly benefited by frequent rollings with *light* rollers, taking care always that it is rolled only when the land is in a dry condition.

The Renovation of Putting-Greens

The usual procedure in the case of a green that has not carried well over the winter, or one that is worn after a season's hard wear, is as follows:

- (1) Cut the grass as closely as your machines will cut it.
- (2) Rake the green thoroughly in several directions. This opens up the soil, aerates it, tears out a good deal of the clover and other weeds, and generally cleans the turf. Iron rakes are used, and preferably those the teeth of which have been specially sharpened. We furnish a rake of this description at \$1.50 each, up (see page 45). The ultimate success of the work depends very largely upon the thoroughness with

which this raking is undertaken, and it may be understood that—within reason—the worse the green looks after this raking the better it will eventually be.

(3) Apply 2 cubic yards of screened compost to a green 25 yards by 20 yards, mixed with 100 pounds of a good chemical dressing, such as Stumpp & Walter Co.'s Emerald Grass Fertilizer. This is assuming that the club is in possession of a compost heap, as suggested on page 26. If compost is not available, use the above quantity of mixed sand and screened top-soil obtained from a source that is known to be comparatively free of weed seeds. The Emerald Grass Fertilizer should be mixed with the sand and top-soil.

(4) Rub this mixture into the turf with the backs of rakes.

(5) Sow from 20 to 50 pounds per green of suitable grass seeds.

(6) Rake the turf lightly to cover the seed that has just been sown, and roll.

Approximate cost per green for materials, \$30.

Very often we find greens that feel very hard to the feet; frequently they stand on soil of a tenacious character, and often their condition is due to excessive rolling, or rolling when the soil was too wet. We describe such a green as "hide-bound."

To correct this condition, the above mixture of compost and fertilizer may be used, but an even better scheme is to substitute for the compost two bales of prepared Golf Fiber, mix with it the fertilizer, and apply to the green and to the approach; then run a *spike roller* over the turf in several directions until the soil is well perforated, and use brushes or rakes to distribute to and fro the mixture until it has finally



In construction work a deal of stump-pulling is often necessary; above shows the type of stump met with at Canoebrook, N. J. Stumpp & Walter Co.'s seeds were used on this course.

disappeared down the perforations. For exceptionally severe cases of "hide-bound" greens, lift the sod with hand-forks—we offer them specially prepared for this work at \$3 each. The method is to insert the fork about 4 inches deep and to bear down upon it until the sod is seen to lift about an inch; the fork is then withdrawn and reinserted 4 inches back and again 4 inches deep, bearing upon it as before. This is, of

course, a big job, but not so big as it looks; a good man should easily hand-fork a green in a day.

After hand-forking it is necessary that the green be brushed thoroughly, so that the prepared Golf Fibre and fertilizer is well worked in; then it must be rolled and made as "true" as it was before in order that the lawn mowers do not injure the turf.

Renovating Fairways

On a typical fairway that needs attention, methods such as the following are usually attended by successful results, though it should be remembered that circumstances may cause modifications:

(1) During April, May, August, or September cut the grass as closely as possible.

(2) Apply the following per acre:

10 loads or more of mushroom soil and 500 pounds of Stumpp & Walter Co.'s Fair-Green Fertilizer.

(3) Harrow and cross-harrow, using a disc with the plates set straight.

(4) Sow per acre 50 to 100 pounds of Stumpp & Walter Co.'s Fair-Green Mixture of Seeds, regulating the quantity of seed to the quality of the turf already there. In other words, use 50 pounds per acre where the turf is good and the full 100 pounds per acre where the turf is thin and poor.

(5) Drag over the fairways a bush harrow, as described on page 2.

(6) Roll.

Approximate cost of materials per acre, \$130.

MODIFICATIONS: On a soil already supplied with an excess of humic material, ten loads or more of sand or of sandy soil should be substituted for the mushroom soil. Again, on a soil showing signs of acidity, the above process may be carried out, generally using sand instead of mushroom soil, and preceding the whole dressing by one of pulverized limestone. Use from 1,000 to 3,000 pounds per acre of pulverized limestone and allow two weeks to elapse after applying the limestone and before commencing to renovate. The usual indications of a soil's need for an application of limestone are discussed in a later section. We also draw attention to the information given in the tabular inset.

Renovating Tees

The renovation of tees may well be carried out along the same lines as that of greens: as a matter of fact, it is a simple matter, when mixing top-dressing materials for the greens to prepare an extra load to use on the adjacent tee.

Tees are often neglected, but it should be remembered that they need even more care than greens, because the wear is so much greater and frequently there is no provision made for watering them.

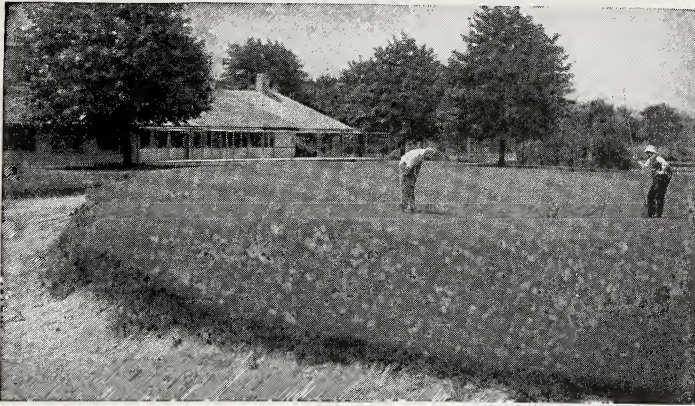
Tees should be inspected at the end of each day's play by the greens staff, and all divots should be filled with screened soil; then spread a ¼-inch layer of mixed soil and Stumpp & Walter Co.'s Divot Formula seeds, using 2½ pounds of the seeds to a pailful of soil. This mixture is a double formula one; it consists, first of all, of fine, strong-wearing, permanent grasses, and then, secondly, of plants not grasses, but the

quickest-growing subjects of a temporary nature that we know. These plants do not last—they disappear in a week or so under cutting—but they convert divots into plant-covered spots, similar in color to the surrounding turf, in two to three days, and when the grasses are established the temporary plants disappear.

A turf nursery, specially sown down with grass seeds suitable for tees, is of great value. When the grass on a particular section is damaged to the extent that it is bare, cut out the turves and re-sod, changing the teeing marks to another section of the tee to enable the patched portion to heal. It is a great advantage to have tees sufficiently large to take care of this: the modern tendency in course-designing is to provide for large tees. We offer seeds for tees on page 11.



Renovating on the Nassau Country Club, L. I. Stumpp & Walter Co.'s Seeds used



The Eighteenth Green at the Garden City Golf Club, Garden City, L. I., where the Metropolitan Amateur Championship for 1920 was played. Grass seed for this course supplied by the Stump & Walter Co.

Experiment with Grasses

Many clubs desire to experiment with special varieties of grass seeds and determine for themselves the suitability or otherwise of these varieties to their soils. We offer for this purpose a Collection of Grass Seeds, sufficient to take care of 20 plots, each 36 square feet. There are 20 varieties in this Collection, one-half pound each of:

South German Bent (Creeping Bent), Colonial Bent (Rhode Island Bent), Red Top, Canadian Blue Grass, Kentucky Blue Grass, Bird Grass or Rough-stalked Meadow, Wood Meadow Grass, Hard Fescue, Chewing's New Zealand Red Fescue, European Red Fescue, Sheep's Fescue, Fine-leaved Fescue, Various-leaved Fescue, Meadow Fescue, Pacey's Perennial Rye Grass, Italian Rye Grass, Bermuda Grass, Carpet Grass, Crested Dogtail, Sweet Vernal.

A good scheme is to prepare a piece of typical soil measuring 10 by 8 yards, mark along each side at 2-yard intervals, and bury furring strips on their narrow edge from point to point, marking out twenty small plots. Sow these with each variety, make and keep a plan of the seedings. The collection of 20 varieties costs \$7.50, postpaid.

The experimental plots should be given reasonable care and attention. They need watering when necessary; cut regularly and roll from time to time.



The greens at the Arcola Country Club are outstanding examples of what Bent turf can be. They are the result of periodic reseeding with European Agrostis, or South German Mixed Bent. The 1923 New Jersey State Championship was held at Arcola. Seeds supplied by the Stump & Walter Co.

What Does It Cost to Build a Golf Course?

Depending on the condition of the soil and the character of the course built, the cost may be between \$750 and \$4,000 per hole, or from \$13,500 to \$72,000 or more for an eighteen-hole course. The higher figures enter in when there is much severe green building, clearing, and blasting to be done. This does not include water-supply; the bringing of water on to the property may cost nothing or it may mean the installation of pumps, gravity tanks, etc. Its actual piping to each of the eighteen greens may cost from \$2,500 to \$5,000. Also they do not include the equipment for the course, concerning which some interesting notes will be found on page 38. While most of the implements to be used on the construction of a course may be hired, the equipment needed for its upkeep requires an investment of from \$3,500 to \$5,500 or more. The above figures, however, do include the cost of seed. If reasonable quantities of high quality seed, in standard varieties, are selected, their share of the cost will be kept within \$5,000. In other words, the seed bill is from about 7 per cent to 35 per cent only of the entire cost; usually it is less than 10 per cent. Is it true economy, therefore, to attempt to save by taking chances with seed? Is it not better to let a firm of specialists supply your requirements and be assured that the proper varieties, botanically true, and of the highest quality, are used?

About 120 acres is the minimum area of land upon which a really good eighteen-hole course can be built.

INSPECTION OF GOLF COURSES

A part of our service is to make personal inspections of golf courses and advise with you on the ground. Frequently we can arrange to do this without cost to you—we suggest that you write us.



At the Shoreacres Country Club, Lake Bluff, Ills., the Twelfth Hole, 135 Yards, Green guarded all around by creek. Grass seed supplied by the Stump & Walter Co.

Turf-Making Grasses

In the United States there are only seventeen varieties of grass commonly used to form the turf of golf-courses, tennis-courts, and lawns. Thirteen of these are produced from seed only, three may be produced from both seeds and runners, and one—Creeping Bent—only be produced from runners.

These seventeen sorts may be divided into two groups: the first, those grasses which have flat, ribbon-like leaves, and, secondly, those which have wire-like or bristly leaves. The flat-leaved grasses include the four varieties which produce runners or creeping stems or stolons." Here is a list of these commonly used turf grasses:

I. Varieties with Flat Leaves

a) Sorts which produce runners or "stolons."

- Velvet Bent, produced from seeds of German Bent
- Creeping Bent, produced from stolons
- Bermuda Grass, produced both from stolons and seeds
- Carpet Grass, produced from seeds

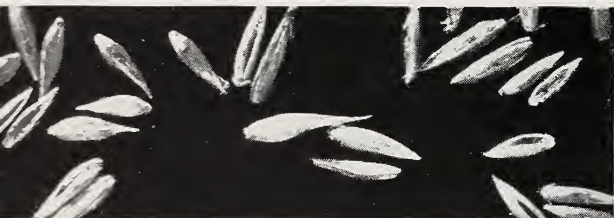
b) Sorts which do not produce "stolons."

- Red Top
- Rhode Island Bent
- Kentucky Blue Grass
- Canada Blue Grass
- Bird Grass
- English Rye Grass
- Meadow Fescue
- Italian Rye Grass

II. Varieties with Wire-Like Leaves

- Chewing's New Zealand Fescue
- Red Fescue
- Sheep's Fescue
- Hard Fescue
- Fine-leaved Fescue

VELVET BENT (*Agrostis canina*). A variety which is ideal for putting greens on good, rich soil. This is the finest of the turf grasses, producing a sward of exquisite silk-like texture and bright emerald color. Most of the finest putting-green turf that has been produced in America since golf-courses were first constructed consists of Velvet Bent. The plant produces short, creeping stems or stolons, but the only practical way to obtain a Velvet Bent turf is to sow seeds of **German Bent**, choice samples of which consist mainly of Velvet Bent.



German Bent × 5 diameters

GERMAN BENT (A natural mixture of *Agrostis canina*, *A. tenuis*, *A. stolonifera*, and *A. palustris*.) This seed is collected by hand by women and children in a few isolated sections of south Germany. The plants occur spontaneously—they grow wild—they are not cultivated as a crop. When they are mature the flowering heads are gathered, carried to collecting stations to be threshed, and the seed placed in bags. Under a magnifying glass the collected material has the appearance of a number of tiny oats; enclosed in the oatlike husk is an exceedingly small grain; this grain is the actual seed.

It is characteristic of **German Bent Seeds** that quite a few of the oat-like husks should be empty; from some the tiny grain has dropped away, in others the husks may never have had a matured grain in them, the flower having been sterile. Most of these empty or sterile husks we are able to remove by means of special machinery, until a high-grade sample may contain 75 per cent or more of pure live seeds. These seeds are so small that 75 per cent means that in one pound of **German Bent Seeds** you have about four million pure live seeds.

Analysis of **German Bent Seeds**, and observation of experimental plots, discloses the fact that the pure live seeds in good samples may consist of as much as 50 per cent of Velvet Bent, 20 per cent Rhode Island or Colonial Bent, and 3 per cent of Carpet or Creeping Bent.

Putting-greens sown with this **German Bent Seed** are of exceedingly fine texture and pleasing color. The turf usually shows some variation in shades of green, the three ingredients varying in color and causing the turf to appear to some critics rather patchy, so far as color is concerned. In texture, however, a well-kept, established **German Bent** turf is quite the finest possible.

CREeping BENT (*Agrostis stolonifera*). A somewhat coarse grass, producing a thick mat of turf that is generally remarkably uniform in texture and color, although the various strains of Creeping Bent vary in these characteristics. The two most satisfactory, in our opinion, are the Washington type, blue-green and vigorous, and the Metropolitan type, which is of a more pleasing color and finer in the leaf. The Metropolitan type was first collected by Mr. George G. Stump and sent to the Experimental Farms at Arlington, Va., in 1918; it was named there originally the "Stump Bent," but during the years in which it has been developed at the Experimental Farms, it has been renamed Metropolitan Bent by the U. S. G. A. Green Section. The only practical way to obtain a turf of either of these two desirable types of Creeping Bent is to plant the stolons, as described on page 8.

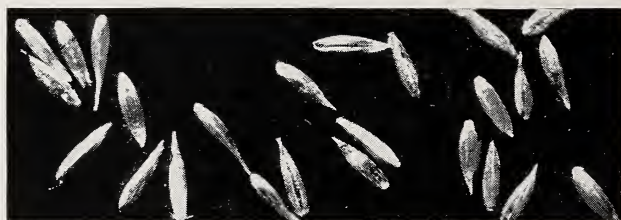
BERMUDA GRASS (*Cynodon dactylon*). Much used for a summer turf in the South. Bermuda Grass may be "vegetated" by planting stolons in a manner similar to Creeping Bent, or seed may be sown; seeding is to be preferred as producing a finer turf and the best samples of seed are those containing a high proportion of the fine, dwarf type of Bermuda known as the "Atlanta strain."

CARPET GRASS (*Axonopus compressus*). A very coarse grass, useful only for fairways in the South on moist land.



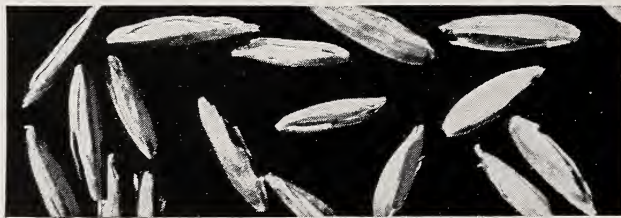
Red Top × 5 diameters

RED TOP (*Agrostis palustris*). Valuable as a *nurse-grass*. If permitted to grow without cutting, it becomes coarse, but it is short-lived under mowing and does not become coarse if kept well cut. Red Top is recommended as an ingredient in most fairway seed mixtures, together with Kentucky Blue Grass and Chewing's Fescue; frequently used in the South for a temporary winter turf.



Rhode Island Bent × 5 diameters

RHODE ISLAND BENT (*Agrostis tenuis*). Makes an excellent turf, especially on moist land. May be regarded as a fine-leaved Red Top, but is more permanent under close cutting. The purest type of Rhode Island Bent is produced in Australasia and is offered by the Stump & Walter Co. under the name of Colonial Bent.



Kentucky Blue Grass × 5 diameters

KENTUCKY BLUE GRASS (*Poa pratensis*). Very widely used for all lawn purposes in the northeastern states. Desirable as a golf fairway grass, particularly on medium to heavy soils that have been limed or which stand on a limestone foundation. Kentucky Blue is of fine color but it is somewhat slow to germinate. It is not, however, considered suitable for putting-greens, except under exceptional circumstances.

Turf-Making Grasses, continued



Canada Blue Grass $\times 5$ diameters

CANADA BLUE GRASS. (*Poa compressa*). Similar to Kentucky Blue Grass but is of a less pleasing color. It is coarser, and is regarded as a cheaper substitute for Kentucky Blue Grass.



Bird Grass $\times 5$ diameters

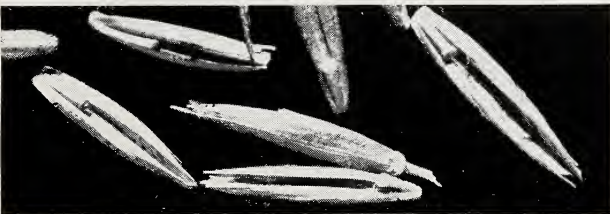
BIRD-GRASS, or ROUGH-STALKED MEADOW GRASS (*Poa trivialis*). One of the few grasses that will grow in shaded situations. A desirable ingredient in shaded fairways, and may also be used in putting-greens where the shadow is very dense.



English Rye Grass $\times 5$ diameters

ENGLISH RYE GRASS (*Lolium perenne*) and **MEADOW FESCUE** (*Festuca pratensis*) are sometimes included in mixtures for fairways and for lawns where quick results are essential. They are a trifle coarse, but they are not permanent; they generally disappear after the slower Fescues and Bents are established. A type of English Rye grass that has smaller seed of a higher specific gravity, producing plants with finer leaves is Pacey's English Rye Grass.

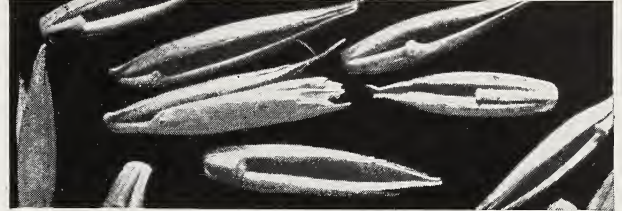
ITALIAN RYE GRASS (*Lolium italicum*). A coarse, tall grass, unsuited for general turf conditions, but useful in the Southern States for forming a winter turf.



Chewing's New Zealand Fescue $\times 5$ diameters

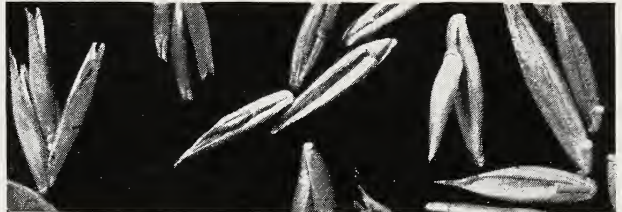
CHEWING'S NEW ZEALAND FESCUE (*Festuca rubra fallax*). Makes a delightful mat-like turf of a pleasing deep green, almost brownish green color. The leaves are very fine, needle-like, and bristly. Makes excellent putting-greens, fairways, and lawns, suits almost all soils, including those of a light and sandy nature, and does remarkably well in shade. Chewing's Fescue loses its vitality very quickly, and samples germinating over 60 per cent in the spring are rare.

RED FESCUE (*Festuca rubra*). European; similar to Chewing's New Zealand Fescue, but not so desirable because it is less uniform; occasional plants of Sheep's Fescue, may be found in turf grown from inferior samples.



Sheep's Fescue $\times 5$ diameters

SHEEP'S FESCUE (*Festuca ovina*) and **HARD FESCUE** (*Festuca duriuscula*). These are suitable for golf-courses, only on poor soils. Both have a tendency to "tussock" and give "cuppy" lies in consequence, and they should therefore be sown in conjunction with other grasses. Both are ideal as a covering for bunkers and for the rough.



Fine-leaved Fescue $\times 5$ diameters

FINE-LEAVED FESCUE (*Festuca tenuifolia*). A splendid grass for putting-greens, producing a beautiful, soft, velvety turf, akin to that produced by Creeping Bent. A combination of Bent seed or Bent stolons with Fine-leaved Fescue makes a turf of extraordinary beauty.

NOTE.—Of the above-mentioned grasses—Bermuda Grass and Carpet Grass are permanent only south of the neighborhood of Richmond, Va.; the remaining varieties are permanent only north of that point. Italian Rye Grass and Red Top are used in the South as a temporary turf during the winter.

ANNUAL MEADOW GRASS (*Poa annua*). A widely distributed weed grass frequently found in putting-greens. It is a dwarf plant, readily distinguishable on account of its light green color and the fact that it may be found in flower practically during the entire season. To eradicate it when in small patches, use a hole-cutter to take out the patches and replace them with good turf. When firmly established it is a good plan to withhold any dressings of lime or fertilizer containing lime, such as bone-meal; to fertilize every few weeks during the growing season with Stump & Walter Co.'s Anti-Clover manure, sheep manure, sulphate of ammonia, nitrate of soda, or other materials which will have the effect of making the soil slightly acid. Seed of the Annual Meadow Grass is not obtainable.



A golf-course in the heart of the city of Brooklyn, N. Y., probably the most unusual situation of any course. The green shown illustrates the congestion of the neighborhood. Curiosity was so much aroused that it was found necessary to fence the greens. Vegetated to Creeping Bent with stolons supplied by the Stump & Walter Co.

Turf from Creeping Bent Stolons PRODUCING A FINE SWARD WITHOUT SEED BY THE VEGETATIVE METHOD



Creeping Bent in Stumpp & Walter Co.'s Nurseries

(1) Growing in the Nurseries of the Stumpp & Walter Co. are rows of Creeping Bent turf, known to botanists as *Agrostis stolonifera*



Shaking the Creeping Bent free of soil

(3) Immediately the turf reaches you, unpack it, and then shake the earth from it. It will be found to consist mainly of tangled stems, like string. These are the "stolons" or runners.



Lifting turf of Creeping Bent for shipment

(2) To make a Creeping Bent lawn, first estimate the size it will be in square feet and then purchase one-tenth the area in Creeping Bent turf. For instance, if your lawn is to be 1,000 square feet in area, order 100 square feet of the turf; it costs 50 cts. the square foot. On receipt of your order the required quantity is stripped as shown, and sent to you by express.



Clipping the turf into 1½-inch lengths

(5) The turf is clipped into pieces about 1½ inches long. Shears are satisfactory for small quantities, but a food-chopper is used for large areas.



Covering stolon clippings with a thin layer of fine earth

(6) Spread the clippings evenly on well-manured, fine, smooth earth, and immediately cover them with ¼ inch of sifted soil.

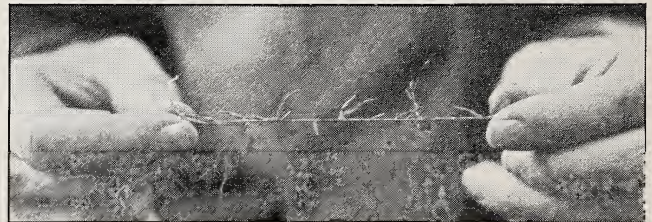
You May Sow Seeds, Too, if you wish. Many turf-producers plant stolons of Creeping Bent and, after covering them with soil, sow seeds of German Bent. If this is done a slightly finer turf is obtained. Use 10 square feet of Creeping Bent turf and ½ pound of German Bent seed to each 100 square feet.

An Important Point. Keep the stolons always slightly moist until you have planted and covered them with soil.



Sprinkling stolons on the new Harmon Golf Links in Brooklyn, New York. Stolons supplied by Stumpp & Walter Co.

(7) Water the newly planted stolons daily for two weeks, by which time the young grass should be well through. Many golf greens are planted with stolons of Creeping Bent.



A "stolon" or runner of Creeping Bent

(4) A "stolon" or runner of Creeping Bent is able to produce new plants at intervals throughout its length.

Why Use Stolons: The advantages of the vegetative method are that by it we get extreme uniformity of turf, both as to texture and color, and maximum freedom from weeds.

Soil Suitable for the Bents: All the Bents require a well-drained soil, naturally moist, friable, and rich; loams and clay loams are suitable; sand loams are suitable if enriched with rotted manure or mushroom soil; light soil and sands are generally unsuitable.

We offer two varieties of Creeping Bent: Washington Bent, and Metropolitan Bent, at 30 cts. the square foot.

For house-lawns, tennis-courts, bowling-greens, and putting-greens, we recommend the Washington Bent. (One square foot will furnish enough clipped stolons to plant 10 square feet.)

Speed with which a Turf may be Obtained: Little difference in time with which turf may be produced from stolons or seed.

When to Plant Stolons: Fall is by far the best time. Small areas may be vegetated in the early spring, but it is not recommended that much be undertaken at that time.

Territory Suitable for the Bents. Generally speaking all the Bents may be grown successfully from the latitude of Washington, D. C., north to the limits of civilization.

Price of Creeping Bent Stolons

FOR spring 1925 we offer turf from nursery rows of Washington or Metropolitan Bent, thick and plentifully supplied with stolons, at:

\$30 per 100 square feet

Quantities of Grass Seeds and Stolons to Use

Disappointment traceable to too light seeding is quite frequent, but it is rare that seed is sown so thickly as to cause failure.

QUANTITIES RECOMMENDED	MINIMUM		AVERAGE		HIGH	
	Lbs.	Value	Lbs.	Value	Lbs.	Value
(a) Golf Putting-Greens						
Separate varieties of Seeds						
{ German Bent	30	\$37.50	45	\$56.25	60	\$75.00
{ Cheving's New Zealand Fescue.....	75	30.00	100	40.00	125	50.00
Mixtures of Seeds						
{ Special Putting-Green Bent Formula	50	32.50	75	48.75	100	65.00
{ Standard Putting-Green Mixture	50	25.00	75	37.50	100	50.00
Stolons. 1 square foot of nursery turf for each 10 square feet to be planted						
(b) Golf Fairways, Polo Fields, Football Gridirons, Diamonds, etc.						
Mixtures of Seeds. Per acre.....	150	75.00	200	100.00	250	125.00
(c) "Rough" on the Golf Course..... 50 to 100 lbs. of seeds per acre (\$15 to \$30)						
(d) Tees..... 1 pound of seeds per each 200 square feet..						
(e) Tennis-Courts						
Regulation size, 78 ft. by 36 ft. Seeds.....	Bus. 1/2	6.00	Bus. 3/4	9.00	Bus. 1	12.00
Full size, 130 ft. by 65 ft. Seeds.....	1 1/2	18.00	2	24.00	2 1/2	30.00
Stolons. 1 square foot of nursery turf for each 10 square feet to be planted.						
(f) House Lawns						
Per acre.....	Lbs. 100	47.50	Lbs. 150	71.25	Lbs. 200	95.00
Per 400 square feet.....	1	.60	1 1/2	.90	2 1/2	1.40
Stolons. 1 square foot of nursery turf for each 10 square feet to be planted.						

NOTE.—Most of our grass seed mixtures weigh 25 pounds to the measured bushel. One pound of grass seed measures, approximately, 1 1/2 quarts; one quart weighs about 3/4 pound.
Use one-quarter to one-half the above quantities when renovating existing turf.

Always leave as long a period as possible between preparing new land and sowing seed, or planting stolons, to give an opportunity for weeds to grow and be destroyed.
Well prepared soil, the finest possible seed, barely covered, or stolons of an approved strain of Bent, are the essentials of good turf.

Hints on Sowing Grass Seeds

Have the soil properly prepared. Not only must it be of such a nature that the young plants will be supported, nourished, and fed, but it must be reduced to the very finest possible condition, free of sticks, stones, clods of soil, pieces of fresh manure, etc. One can hardly spend too much time, care, and attention in the preparation of the soil; before entrusting to it the best seed you can buy, see that it is worked up to the very finest pitch of perfection. Screen the uppermost layer if your appropriation permits. Leave as long a period as possible between preparing the soil and sowing.
Sow the seed only on a still day. If you attempt to place seed on or into the ground when there is a wind blowing, you lose part or all of it, and you will be at a loss to account

for patches, or large or small areas that are bare when later they should be covered with verdure.

Do not cover the seeds too deeply. Most grass "seeds" are very much smaller than they appear. The seeds, as we know them, are husks which contain at one end the very tiny grain, and it is only from this grain that the young plant is developed. When we thus consider how very small the seeds actually are, it will be realized how easy it is to cover them too deeply. The thing to do is, as soon as the seeds have been scattered onto the soil, to very lightly stroke the soil with rakes, being careful to just cover the seed and no more. If there is any doubt in your mind as to your being able to cover seed sufficiently lightly, you may take a portion of soil and mix the seed with it; then scatter the soil-and-seed mixture and roll. Or you may take a hand-sieve or riddle and sift onto the seeds a light coating of screened soil, sufficient barely to hide them from view. On large areas, sow with a wheelbarrow seeder and follow with a bush harrow, as described on page 2. A good final preparation of the soil before seeding is to run a Cultipacker over the land, then sow and Cultipack a second time, driving the machine at right angles to the first direction, which will take the place of the rolling described in the following paragraph. It is necessary to use a team or tractor to pull the Cultipacker, and its use is therefore restricted to spaces of an acre up.

Roll immediately the seeds are sown. If you sow seeds and do not roll, they will be largely wasted unless you have used a Cultipacker. Rolling at once compacts the soil, and water from the lower layers of the soil is induced immediately to come to the surface by capillary action, and growth will commence, even if the weather is comparatively dry. It is generally not necessary to water newly sown land: better to wait until the young seedlings appear, except in the case of a settled spell of drought, in which case watering may be necessary.



When sowing grass seeds by hand, the back should be well bent. It is a good plan to divide the seed into two portions and to cover the land twice to insure its even seeding. Stir the contents of the bag now and again.

The Stumpp & Walter Position

We do not design golf courses. Our policy is to **sell** the choicest, cleanest seeds it is possible to produce, to offer them at moderate prices with a knowledge of the purpose for which they are intended, and to **furnish** the best and most complete service we can.

Our Advisory Service

Inspection. An experienced representative, with both practical and scientific training, in coöperation with the chairman of your green committee and your greenkeeper, makes a careful survey and record of your turf conditions. Usually we can make this survey without cost to you, though it may be necessary to arrange beforehand a nominal fee to cover travelling cost.

Recommendations. We later specify, in a detailed written report, the correct practice that should be followed.

Checking. Following the acceptance of our recommendations, we make a periodical inspection to satisfy you that the work is being carried out satisfactorily.

Advice by Mail. It is our practice to give the most complete attention to queries which reach us by mail, and we welcome correspondence.

Our Construction Staff

We are prepared to furnish the services of expert foremen to assist your own staff in construction and renovation projects, on a weekly salary basis. Details on request.

NOTE.—Our efforts are confined to the production of turf and to the carrying out of your golf architect's structural plans—we do not design courses.



On the greens at New Saranac Inn, a delightful eighteen-hole course in the heart of the Adirondack Mountains. Stumpp & Walter Co.'s seeds used.

Crops Recommended for Green Manuring

Seeds broadcasted thickly and the crop plowed under the land, there to decay and add humic material and fertilizing elements to it.

	Quantity when sown alone		Price subject to market change			
	100 sq. yds.	Acre	Qt.	Lb.	10 lbs.	100 lbs.
For early spring seeding before frosts are entirely over.						
*Spring Vetch.....	3 lbs.	100 lbs.		\$0 20	\$1 25	\$10 00
*Canada Field-Peas.....	3 qts.	3 bus.	\$0 30	\$1 75	\$5 25	\$50 00
Spring Rye.....	2 qts.	2 bus.	25	1 25	3 75	35 00
For seeding after settled warm weather has commenced. Frost kills these varieties.						
*Soy Beans, Mammoth Yellow.....	2 qts.	2 bus.	30	1 75	5 50	52 50
*Soy Beans, Ito San.....	2 qts.	2 bus.	30	1 65	4 75	45 00
*Cowpeas, New Era.....	2 qts.	2 bus.	35	2 25	6 50	62 50
*Cowpeas, Whippoorwill.....	2 qts.	2 bus.	35	2 25	6 50	62 50
Japanese Buckwheat.....	2 qts.	2 bus.	20	90	3 00	27 50
For seeding during the summer and fall. These stand frost; they are frequently sown to remain until the spring, to be plowed under then.						
Winter Rye.....	2 qts.	2 bus.	20	1 25	4 25	40 00
Winter Wheat.....	2 qts.	2 bus.	20	1 50	4 50	42 50
				Lb.	10 lbs.	100 lbs.
*Winter or Hairy Vetch.....	3 lbs.	100 lbs.		\$0 30	\$2 50	\$20 00

It is desirable to sow combinations of the above. When mixed together the stated quantities per acre should be reduced in proportion. Varieties marked * are legumes, and are of additional value on account of the nitrates which are added to the soil by the colonies of bacteria found in the nodules on the roots of leguminous plants.

The Annual Upkeep of a Golf Course



When the fairways of the Baltusrol, N. J., new course were under preparation, soy beans were sown for a plow-in crop. Stumpp & Walter Co.'s seeds were sown on this course.

We suppose the minimum budget of a club of championship grade, so far as the upkeep of the course is concerned, would average about \$17,500 annually. While many metropolitan clubs find it necessary to spend more than this sum, others away from the big cities can get along with very much less, some for as little as \$5,000. Less than 15 per cent of these sums represents purchases of supplies from the seedsman. Since the proportion is so small, why not get the best possible quality at all times, such as is supplied by a specialty house? The best is eventually the cheapest, and the Stumpp & Walter Co. offer their goods with a full knowledge and appreciation of the purpose for which they are to be used.

Stump & Walter Co.'s GOLF TURF

Grass Seed Mixtures

Shipped charges prepaid when cash accompanies order

FOR GOLF		Weight per bushel lbs.	Lb.	5 lbs.	25 lbs.	100 lbs	
SPECIAL PUTTING-GREEN BENT FORMULA. Recommended for well-prepared, rich soils. German Bent, containing Velvet Bent and Carpet Bent, formerly widely sold under the name of "Creeping Bent," is exceedingly scarce and high-priced. This formula contains an increased proportion of this choice seed.		25	\$0 85	\$4 00	\$18 00	\$65 00	
STANDARD PUTTING-GREEN MIXTURE. Recommended for light, dry soils. This is composed of South German Bent, fancy re-cleaned Red Top, and Chewing's New Zealand Red Fescue—all of high purity and strong vitality. The formula we use is a thoroughly proved one, well balanced and absolutely reliable.		25	65	3 00	13 50	50 00	
FAIR-GREEN MIXTURE. The variety of Grass that grows naturally on the particular soil should form the basis of a Fair-Green formula. For limited seedings, our standard formula is good, and we know it will give satisfaction; it is well balanced, and the Grasses of which it is composed will give an even, tough and lasting turf. Fine Quality		20	40	1 75	8 00	30 00	
Superfine Quality , contains 20 per cent German Bent.....		25	55	2 50	11 00	40 00	
SPECIAL MIXTURE FOR TEES. Our formula includes only those varieties which will stand rough usage and recuperate quickly after excessive wear.....		25	55	2 50	11 75	45 00	
SPECIAL "ROUGH" FORMULA. Consists of the taller-growing hardy perennial grasses in combination with gorse, yarrow, and other plants suitable for the purpose and least likely to give serious trouble as weeds, should their seed be carried by the wind and other agencies on to your greens or fairways.....		22	40	1 75	8 00	30 00	
MIXED FESCUES FOR BUNKERS. A mixture of Red, Hard, Dwarf, Fine-leaved, Various-leaved, and Tall Fescues. Excellent for mounds, bunkers, and exposed sand..		22	60	2 75	12 75	50 00	
SPECIAL DIVOT FORMULA. Always keep a bag in stock. A mixture consisting of (a) seeds of fine, strong wearing, permanent grasses suitable for fairways and tees, with (b) seeds of the quickest growing plants we know that are of a temporary nature. The temporary plants grow immediately, and in a day or two you cannot locate the divot; in the course of a few weeks, with cutting, the temporary plants disappear, leaving the permanent grasses, now established, in full possession of the soil.....		25	60	2 75	12 75	50 00	
FOR POLO							
HURLINGHAM FORMULA. For fine, uniform, hard-wearing, and quickly recuperating turf we find that the formula of grass seeds as long used at the famous English field at Hurlingham gives the utmost satisfaction in this country. The grasses used are of the best superfine quality, of the highest purity and strongest vitality.....		25	60	2 75	12 75	50 00	
FOR TENNIS		Weight per bushel lbs.	Qt.	4 qts.	8 qts.	Bus.	
FOR TENNIS. West Side Formula. The turf required for lawn tennis must be firm and yet elastic, and composed of grasses which can be mown close and kept exceedingly dwarf. This mixture is composed of the best-known, fine-leaved, deep-rooting grasses, properly proportioned so as to give an even playing surface throughout the year.....		25	\$0 50	\$1 75	\$3 25	\$12 00	\$115 00
FOR LAWNS							
STAIGREEN. The best lawn seed on earth—for carpet-like turf. The varieties are carefully proportioned so that they will succeed one another in brightness of foliage, with the result that the lawn, even in its first year, will have a bright, rich green color from early spring until covered by snow.....		25	Lb. \$0 60	5 lbs. \$2 75	25 lbs. \$12 00	100 lbs. \$47 50	. . .
SHADY PLACE LAWN SEED. By using the correct seed varieties it is generally not at all difficult to obtain a good turf under trees. In particularly stubborn cases, where the shade is very dense, it is desirable to add lime every fall, dig lightly every spring, apply Pulverized Sheep Manure, rake and sow Shady Place Lawn Seed.....		20	Qt. \$0 50	4 qts. \$1 65	8 qts. \$3 00	Bus. \$10 00	97 50
SOUTHERN LAWN SEED. From central Virginia south the ordinary northern grasses will not thrive permanently, and good results are not likely to follow the use of the customary mixtures. As a result of an intimate knowledge of southern conditions we offer a special formula which we find is highly satisfactory. We advise that two seedings be made, one in spring and one in fall.		20	45	1 50	2 50	9 50	90 00
SEASHORE LAWN SEED. The varieties of which this mixture is composed are selected for their deep rooting qualities, resistance to salt spray and high winds. Recommended for situations on the ocean front where difficulty has been experienced in getting a lawn with the usual grass seeds.....		22	40	1 25	2 25	8 50	80 00
TERRACE SOD LAWN SEED. For Terraces, Hillside and Embankments. A special mixture of grasses best suited for sowing on terraces and hillside; produces a rich, green turf throughout the season.....		20	50	1 75	3 25	12 00	115 00
HIGH-GRADE LAWN SEED. For parks and other large areas. The grasses of which it is composed are well selected, clean, and of high vitality. We recommend this mixture for those cases where low initial cost is of more importance than extreme fineness of turf.....		22	40	1 25	2 25	7 50	70 00

QUANTITY OF SEEDS TO ORDER

Golf: Putting-green 100 lbs., fairway 200 lbs. per acre, average tee 25 lbs.

Polo: 200 lbs. per acre.

Tennis: 1 to 2 bushels per court.

House lawns: 1 lb. per 400 square feet or 100 lbs. per acre; 2 qts. per 400 square feet or 4 bushels per acre.

If turf is needed in shortest possible time, multiply by 2. When repairing turf, divide by 2. One pound of seed measures approximately 1 1/3 quarts; one quart weighs about 3/4 pound.

Stumpp & Walter Co.'s GOLF TURF

GRASS SEEDS OF KNOWN PURITY AND PROVED VITALITY

The Grass Seed problem, whether applied to the golf course or lawn, is one that can be rightly solved only when the grower fully takes into consideration four essential details: SEED, SOIL, LOCATION, and CLIMATE. Advice regarding varieties for special locations freely given on request.

*The "Ligule" is a small membranous lip found on the inside of the leaf at a point where the leaf and stem part company. If a grass shoot be cut across with a knife, the leaves will be found folded flat with some varieties and rolled in others. The ligule and the manner of folding are important means whereby varieties may be distinguished.

†Indicates desirability of using mixtures rather than one variety for turf.

‡Dwarf habit indicates suitability of a variety for lawns.

VARIETY	DESCRIPTION* Helps you to distinguish varieties in your turf	PERIOD OF MAXIMUM DEVELOPMENT †	USE	SOIL SUITABLE	Height Ins. if Uncut ‡	Weight Per Bushel	PRICE per 100 lbs.
AGROSTIS VARIETIES OR BENTS (1 lb. contains about 4,000,000 live seeds)							
German Bent, Creeping Bent, European Agrostis, Fiorin (<i>Agrostis species</i>).	"Creeping Bent," a name used for many years for seed collected in Central Europe; and consisting of a mixture of <i>A. vulgaris</i> , <i>A. canina</i> , <i>A. palustris</i> .	Early fall	Makes velvet-like, thick, beautiful, soft putting-greens and lawns; used largely in conjunction with Red Fescue. Superfine Quality Fine Quality	All; especially moist land.	12	24 16	\$125 00 90 00
Rhode Island Bent (<i>A. tenuis</i> ; <i>A. vulgaris</i> ; Colonial Bent).	Blades very narrow, flat. Slightly creeping. Forms a brownish green velvety turf. Leaves are rolled in the bud.	Early fall	Splendid for putting-greens and fine lawns. Rhode Island and Colonial Bent are identical. Superfine Quality Fine Quality	All soils.	18	24 18	135 00 95 00
Red Top (<i>A. palustris</i> ; <i>A. alba</i>).	Leaf-blades narrow, becoming very narrow with turf cultivation; plants slightly creeping. The young leaves are rolled in the bud. Prominent ligule.	Early fall	Valuable for fair-greens and tees. Superfine Quality Recleaned Quality Ordinary Good Commercial Quality (unhulled)	All soils.	24	36 32 18	30 00 25 00 17 50
POA VARIETIES OR MEADOW GRASSES (1 lb. contains about 2,000,000 live seeds)							
Canada Blue Grass (<i>Poa compressa</i>).	Leaf-blades narrow, flat; plants slightly creeping; stems flattened; color gray-green.	Early summer	Valuable for tees and fairways; not much used for greens, Kentucky Blue Grass being more recommended. Good bottom grass.	All; clays and those with lime.	12	18	\$37 50
Kentucky Blue Grass (<i>P. pratensis</i> ; June Grass). Weight per bushel of commercial Kentucky Blue Grass ranges around 19 pounds. Stumpp & Walter Co.'s grades weigh from 21 to 25 pounds per bushel; such high-grade samples are rarely offered on the open market.	Leaf-blades very narrow, flat; plants slightly creeping. Deep vivid green. More effective the second year than the first. Ligule short and thick. The young leaves are folded in the bud.	Early summer	Ideal ingredient in fairway mixtures; occasionally used for putting-greens. Largely employed for lawns; makes the best, sweetest, and most nutritious pasture. Superfine Quality Fine Quality	All; particularly those containing lime.	12	25 21	55 00 40 00
Rough-stalked Meadow Grass, Bird Grass (<i>P. trivialis</i>).	Leaf-blades narrow, flat; plants not creeping. The young leaves are folded in the bud. Lower surfaces of leaves glossy.	Early summer	Suited for putting-greens, fairways or lawns under trees. Quite the best grass for shaded situations. Makes an exquisite turf.	All soils, including sandy.	12	26	65 00
Wood Meadow Grass (<i>P. nemoralis</i>).	Leaf-blades narrow, flat. Medium dark green. The young leaves folded in the bud. Leaf joints black.	Late spring	Of limited use in America; cannot be traced as permanently adapted to our climatic conditions.	All of medium texture.	12	20	85 00
FESTUCA VARIETIES OR FESCUES (1 lb. contains from 500,000 to 1,000,000 live seeds)							
Hard Fescue (<i>Festuca duriuscula</i>).	Leaves wire-like; plants tend to grow in tufts.	Late spring	Must be carefully balanced when in golf mixtures, otherwise may give "cuppy" lies.	Sandy, thin, dry soils	12	20	\$30 00
Red Fescue (<i>F. rubra</i>), Chewing's, N. Z.	Leaves wire-like and stiff, not flat; plants have a tendency to creep, but frequently form tufts.	Summer	Excellent for putting-greens, tees, and fairways; also hay- and pasture-fields. Gives fair results under trees.	Satisfactory on poor land.	12	27	40 00
Red Fescue, European	Leaves wire-like and stiff, not flat. Ligule reduced to short ears.	Late spring	Occasionally used on sheep pastures; excellent for the "rough" on golf-links.	Any except wet land.	12	27 16	40 00 30 00
Fine-leaved Sheep's Fescue (<i>F. ovina angustifolia</i> ; <i>F. capillata</i> ; <i>F. tenuifolia</i>).	Leaves wire-like and stiff, not flat; very fine. Color a beautiful dark green.	Late spring	Used on putting-greens and tees. Gives fair results where situation is shaded.	Any dry soil.	12	22	65 00
Various-leaved Fescue (<i>F. heterophylla</i>).	Bottom leaves are bristly; upper leaves flat. Fine dark green. Plants of a tufted habit.	Late spring	Used to a limited extent on tees and fairways; also of value as an ingredient in hay and pasture mixtures.	Light soils, rich in humus.	15	15	70 00
Meadow Fescue (<i>F. pratensis</i>).	Leaves very broad and flat. Base of leaf-sheaths red. The young leaves are rolled in the bud.	Summer	Gives an abundance of fodder as a hay or pasture grass. Useful to the golfer only for the "rough."	Any soil unless water-logged.	36	25	20 00
Tall Fescue (<i>F. elatior</i>).	Leaves medium broad and flat.	Summer	A nutritive variety of which cattle are very fond.	Any.	48	22	35 00

Stump & Walter Co.'s GOLF TURF

GENERAL LIST OF GRASS SEEDS, continued

VARIETY	DESCRIPTION* Helps you to distinguish varieties in your turf	PERIOD OF MAXIMUM DEVELOPMENT†	USE	SOIL SUITABLE	Height Ins. If Uncut †	Weight Per Bushel	PRICE per 100 lbs.
LOLIUM VARIETIES OR RYE GRASSES (1 lb. contains about 300,000 live seeds)							
English Rye Grass (<i>L. perenne</i>).	Leaves narrow and flat, smooth and shining; leaf-bases red. Usually lives three years. The young leaves are folded in the bud.	Summer	A rapid grower and of value as a "nurse grass" under some conditions; particularly useful where a lawn is needed quickly; valuable for hay and pasture.	Medium soil well supplied with moisture.	24	28	\$22 50
Pacey's Perennial Rye Grass (<i>L. perenne Pacey</i>).	A smaller - seeded, finer-leaved, smaller plant than the above.	Summer	Superior to the above for turf purposes; claimed to be more resistant to cold.	As above.	24	30	25 00
Italian Rye Grass (<i>L. Italicum</i> ; <i>L. multiflorum</i>).	An annual grass with a tendency to grow in tufts; tall; broad, flat leaves. Base of sheaths red. The young leaves are rolled in the bud.	Early summer	In the North occasionally valuable as a "nurse grass." Disappears after one year. In the South makes excellent winter turf, following Bermuda Grass.	Medium soil well supplied with moisture.	36	22	20 00
Wimmera Rye Grass (<i>L. subulatum</i>).	An annual grass much used in hot climates.	Summer	Gives mammoth returns on rich land.	As above.	36	24	35 00

BROMUS VARIETIES OR BROME GRASSES (1 lb. contains about 250,000 live seeds)

Awnless Brome Grass (<i>Bromus inermis</i>).	A large-growing perennial stoloniferous grass.	Summer	Useful for binding the soil of embankments. A pasture grass recommended for the dry soils of the Northwest.	Any.	30	14	\$30 00
Prairie or Rescue Grass (<i>B. Schræderi</i>).	A coarse, harsh annual.	.....	Used in the South as a winter grazing grass.	Any.	30	18	22 50

SUNDRY VARIETIES

Bermuda Grass (<i>Cynodon dactylon</i> ; <i>Capriola dactylon</i> , Scotch Grass).	A medium broad-leaved grass, strongly creeping. North of Virginia winter kills it; in the South it survives winter but in a dormant condition.	Early fall	Valuable in the South for putting-greens, fair-greens, and lawns; also for pastures and hay-fields. Binds sand.	All soils.	12	36	
			Superfine Quality				\$65 00
			Fine Quality				50 00
Carpet Grass (<i>Axonopus compressus</i>).	A coarse perennial with creeping root stocks.	Summer	Satisfactory turf grass for the moist sandy soils of Florida.	M o i s t sands.	12	24	75 00
Crested Dog's-tail (<i>Cynosurus Cristatus</i>).	Leaves narrow and flat. The young leaves are folded in the bud. Base of leaf-sheaths yellow.	Early summer	Of limited usefulness in this country.	Hard, dry loams.	24	30	40 00
Dallas Grass (<i>Paspalum dilatatum</i>).	A strongly growing perennial.	Summer	Gives splendid grazing summer and winter in the South.	All soils.	30	20	75 00
Meadow Foxtail (<i>Alopecurus pratensis</i>).	Medium broad, flat leaves. Flower-heads resemble timothy. Base of leaf-sheaths violet. The young leaves are rolled.	Late spring	As a field-grass gives large yields early.	All soils.	36	10	85 00
Orchard Grass (<i>Dactylis glomerata</i> ; Cocksfoot).	Large plant, bluish green in color, with flattened leaf-bases. Ligule prominent. The young leaves are folded in the bud.	Late spring	Widely used for hay and pasture, for which purposes it is of additional value in that it thrives under trees.	All soils.	48	14	35 00
Rhodes Grass (<i>Chloris virgata</i>).	A large, coarse perennial.	Summer	A splendid hay crop for the South.	All soils.	36	25	80 00
Sweet Vernal (<i>Anthoxanthum odoratum</i>).	Narrow, flat leaves. The young leaves are rolled in the bud; leaf-sheaths hairy.	Late spring	Very fragrant when drying. Occasionally used in mixtures of seeds for hay-fields.	All soils.	18	10	120 00
Tall Oat Grass (<i>Avena elatior</i> , <i>Arrhenatherum elatius</i> ; False Oat Grass).	Very broad leaves; plant has the appearance of a slender, small oat.	Early summer	Valuable for hay and pasture.	All soils.	48	14	50 00
Timothy (<i>Phleum pratense</i> ; Herd's Grass; Cat's Tail).	Very broad leaves; coarse, vigorous plant. Ligule small, pointed. Young leaves rolled in the bud.	Summer	The most important American grass for hay and pasture.	Rich land.	36	45	15 00

FURTHER INFORMATION ON GRASSES: For additional reading on this subject we recommend:

"Text Book of Grasses." Cultural notes for the farmer, with botanical descriptions. 276 pages, many illustrations. A. S. HITCHCOCK. Price, including postage, \$2.25.

"Turf for Golf Courses." Authoritative and practical treatise on the production of turf. 262 pages, with photographs and maps. C. V. PIPER and R. A. OAKLEY. Price, including postage, \$3.

Sundry Seeds for Golf Courses

SUPERFINE WHITE CLOVER. Oz. 10 cts., 1/4 lb. 30 cts., lb. 85 cts., 10 lbs. \$6.75, bus. (60 lbs.) \$39, 100 lbs. \$65. Mixed with grass seeds the usual allowance of Clover is 5 per cent. We do not include White Clover in our mixtures for putting-greens, fairways, tees, tennis-courts, polo fields, nor in our Staigreen Lawn Seeds.

YARROW (*Achillea millefolium*). A deep-rooting, drought-resisting plant with delicate, fern-like leaves, sometimes used on tees or putting-greens. May be sown alone (when one pound is sufficient for a plot of ground 40 by 40 feet) or in combination with grass seeds. Lb. \$2.

GORSE, or FURZE (*Ulex Europæus*). This shrub makes British courses bright with its yellow blossoms in the spring. It is a slow grower and it will be some years before it will be effective. Broadcast ten pounds per acre over the "rough" and harrow in. Not recommended for the extreme North. Lb. \$1.50.

SCOTCH HEATHER. This plant may be found growing wild, introduced accidentally from Europe, in the eastern United States from Canada to New Jersey, and within these limits attempts to grow it should be successful: elsewhere it may be regarded as more experimental. The seed germinates very slowly. Plants, \$60 per 100. Seeds, pkt. 25 cts., oz. 60 cts., 1/4 lb. \$2.25, lb. \$7.50.

Eradication of Clover from Turf

Of the several varieties of clover in commerce, there are but few which are of sufficiently dwarf habit to enable them to live under the constant cutting and rolling of a lawn, the chief is white Dutch clover. Until recent years it has always been a custom to include this white Dutch clover in every mixture of seeds, the reason being that the plants grow very speedily and root very deeply. In consequence, a turf is very quickly obtained after sowing with a clover mixture, and the clover generally stands dry weather very well, its roots drawing moisture deep in the soil, when the shallow-rooting grasses are suffering from drought. Players have long recognized the objections to white clover, particularly on golf greens, and also to an extent on the fairways. The comparatively broad leaflets of white clover look strangely out of place where a fine turf is required. Clover plants wear very badly. While grass will stand up well under the heavy wear of tennis or polo, clover bruises down into a sticky mass. Old customs die hard, and it is frequently still urged that a mixture of grasses and clover be sown, but the modern greenkeeper regards clover as a weed under all conditions, and it is to him a very noxious weed in that it is so hard to eradicate. The drought-resisting properties of white clover are largely possessed also by the Fescue grasses which are much used nowadays and which give good results in dry situations.

When clover has appeared as being one of the weeds natural to a soil, the following is the best course to pursue:

(a) Thoroughly rake the turf with very sharp fine-toothed rakes. This will tear out quite a quantity of the creeping stems of the white clover, and it will further have the effect of opening to the air the soil surrounding the roots of the grass plants, thereby stimulating them.

(b) Apply Stumpp & Walter Co.'s Anti-Clover Manure at the rate of 2 1/2 ounces per square yard (75 to 100 pounds per average green), first mixing the manure with twice its bulk of sand, compost, screened mushroom soil, or humus.

(c) Work the preparation into the green by rubbing the turf with the backs of the rakes.

(d) Three weeks later apply Sulphate of Ammonia, similarly mixed with compost or other material, at the rate of less than 1 ounce per square yard, or less than 30 pounds to an average green. Give further dressings at intervals of three weeks.

(e) Repeat these treatments: one application of Anti-Clover Manure, followed by several of Sulphate of Ammonia. Stop when the clover plants become smaller and finally disappear.

On land from which you are discouraging clover, never use fertilizers showing a high phosphoric acid content (see table of fertilizers) and never apply lime. If indications point to the necessity for applying lime use charcoal instead; also look into the matter of drainage. Greens on to which surface water drains are frequently infested with clover; diverting this water will result in cleaner greens.



During the 1921 Women's Championship at Hollywood, N. J. Stumpp & Walter Co.'s grass seeds used

When to Sow Grass Seeds

Late summer is the time when Nature herself sows her seed, and all other things being equal, late summer or early fall is the best time for sowing seed, and this is more especially so if the seeding is a large one. The soil is warm at that time and it is generally in very good condition for plowing, harrowing, and rolling. After sowing, the first shower will cause the plants to show above the surface of the soil. A course constructed and sown in August or September should be in shape for play the following June; that is, if the soil is suitable, the right varieties of seed have been sown in sufficient quantity and the season is one favorable to the growth of grass.

Sometimes circumstances demand that the seeding should take place in the spring, and that is not at all a bad time to do this work; it is the next best, after fall seeding. Seeds will not germinate anything like so quickly or so well in the spring as in the fall, chiefly because the land is cold; and a little more patience is necessary. In the section around New York the chief difficulty attendant upon spring seeding is that a heavy weed crop will grow along with the grass—crab-grass in particular will give trouble. With fall seeding weeds are not so serious a problem. Spring seeding may be undertaken just as soon as all frost has left the soil and the land becomes sufficiently dry to work without injury. It must



The correct way to use a hand-fork. Note that the greenkeeper's left hand slides down the shaft prior to lifting. (1) Dig the soil about 6 inches deep, but only when it is dry; if rain has fallen recently allow a few days of fine weather to elapse before commencing work. (2) As you dig, lift each clod high enough to enable you to turn it completely over. (3) Strike the inverted clod with the back of the fork to break it.

be remembered that any digging, plowing, raking, or harrowing that is done when the land is wet will have the effect of solidifying it into hard lumps, and it may take several years to get the land into good condition again.

Grass seed may be sown in the *late* autumn, and it is not uncommon to sow it on the snow, the idea being that, as the snow disappears, the seed is gently deposited in the soil, and it will start to grow very early. This can only be done where the land is level, as anything in the nature of a washout when the snow disappears in the spring will mean that all the seed deposited will be wasted. There is only a month or so in the very driest and hottest part of the summer during which large quantities of seed cannot be sown economically. It is a great advantage if land be prepared early, and allowed to lie fallow during these hottest months. Occasional rains may start weed seeds into growth, and frequent harrowings or rakings will destroy them.

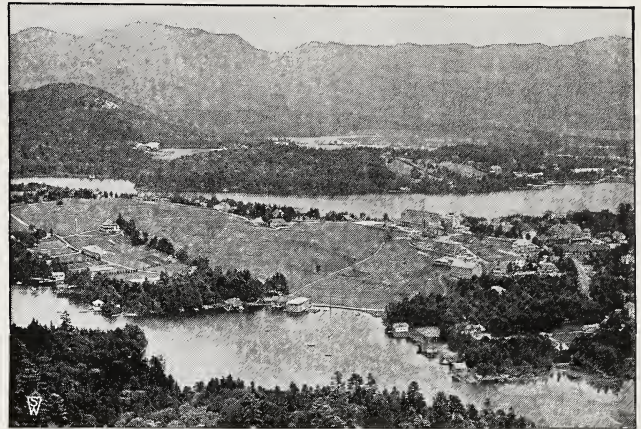


Photo: Major Hamilton Maxwell

Airplane view of the nine-hole course of the Stevens House at Lake Placid, in the Adirondack Mountains. The Stump & Walter Co. offers a complete service to resort hotels—grass seeds and fertilizers, vegetable and flower seeds, advisory help when called for.

Sowing Seeds on Mounds

The greenkeeper is often confronted with the problem of covering with verdure a recently constructed mound or bunker. Top-soil is either not available or the shape of the mound and its steep grades render impossible the spreading of the coating of top-soil necessary to carry grass. We suggest the following method:

Equip your men with grub hoes or mattocks (suitable types are listed on page 45) and with pails containing a fifty-fifty mixture of soil and rotted manure or mushroom soil, or compost, to which has been added 2½ pounds of seed of Mixed Fescue Grasses for Bunkers. Now, with the mattocks open up holes in the sides of the mound about 5 inches across and 5 inches deep; let the holes be evenly spaced about 15 inches from center to center. Fill the holes with the mixed compost and seed, and tamp firmly.

A weedy bunker or mound on which plantain, chickweed, dandelion, crab-grass, and other weeds flourish is a menace to all your greens. Its shape frequently prevents cutting, and the consequence is that weed seeds are allowed to blow all over the course. On the other hand, the Fescues are excellent grasses for putting-greens, and they may be allowed to seed on the bunkers without risk of doing any damage. Further, Fescues are quite the best grasses for exposed, dry, sandy situations.



Clumps of wild grasses, obtained from the neighborhood, increase interest in the traps of the Huntington Country Club. Stump & Walter Co.'s seeds used on this course.

Seeds—Price versus Quality

The Stumpp & Walter Co. sell their seeds strictly as of proved maximum purity and maximum vitality. In other words, they do not allow seeds to leave their premises until the findings of their Analyst, supported by certificates of Federal and State testing departments, show the highest possible percentage of *purity* and of *germination*.

Maximum Purity means that Stumpp & Walter Co.'s grass seeds are passed through various screening devices so many times, that all the weed seeds and rubbish are removed that is possible. Each time seeds are treated in this way they are reduced in quantity and that is why thoroughly re-cleaned seeds are worth more than seeds which have not been so carefully screened.

Maximum Vitality means that from the bags of seed in Stumpp & Walter Co.'s warehouses, samples are sown at regular intervals, and that nearly all of the individual seeds grow. Not only do they germinate, but they grow promptly, vigorously, and all at one time. Sometimes samples are tested in this way which do not possess the highest germination, and these are discarded by the Stumpp & Walter Co. Conducting these tests in the laboratory, greenhouses, and open ground is costly, and to discard seeds which do not prove up to standard is also expensive.

There are other points which affect the quality of seeds that a report by a botanist does not indicate, and the standing of the seedsman is the only assurance that the user can have regarding them. Among them are:

Source of Origin. This has an important bearing on quality. Collectors and growers are not alike in the handling of their product—some are careful, others are careless. Many years' experience enables the Stumpp & Walter Co. to determine who are careful and who are not, and to make direct personal contacts with the best producers in those localities most suited to the growth of a particular variety—Bent from Germany, Fescue from Australasia, Blue Grass from the Ohio Valley.

Botanical Trueness is also important. The difference between some seeds is so slight as to be barely visible under the microscope. It is necessary, however, that when you pay for Kentucky Blue Grass you do not receive Canada Blue Grass and that Red Top is not supplied to you in place of Bent. Stumpp & Walter Co.'s seeds are guaranteed to be botanically true.

Newness is vital. An analysis may give an idea as to the purity and germination of a sample, and yet the seeds may be old; the seeds may grow, yet they may not possess the vital energy of new seed. Stumpp & Walter Co.'s grass seeds for sale in the spring of 1925 are guaranteed new crop, harvested in 1924.

Not Blended. Many samples of seed of commercial grade on the market are blended—new seed with old, good seed with poor, living seed with dying seed. Blending cannot be detected by an analysis; the reputation of the supplier and his statements are your only assurance. Stumpp & Walter Co.'s seeds are not blended.

Specific Gravity of seed samples should be high if the seed is of good quality. Specific gravity is expressed roughly by weight per bushel and it is increased by constant re-cleaning; the weight per bushel of Stumpp & Walter Co.'s seeds is the highest that modern machinery used continuously will make it.



The Appearance of Grass Seeds means a great deal to the experienced purchaser. Stumpp & Walter Co.'s samples look fine, pure, bright, and clean.

Very quick growth is not of itself a reliable indication of quality or of eventual satisfaction. Users of bargain seeds have frequently sown mixtures consisting largely of Timothy or of Red Top, both of which grow very quickly and produce in a few days a very fine velvety turf as seedlings. Timothy quickly leaves the seedling stage and develops into a coarse, harsh plant, displeasing in color and highly objectionable from the golfer's point of view. The Bents and the Fescues, however, are slower to grow; they are not only fine at the start, they remain fine and produce a turf that improves as the years pass. Germination is important, but purity, origin, trueness, and newness are more important.

The Stumpp & Walter Co. are seed suppliers of repute. They are experienced in the production of good seeds and they are skilled in their use. They appreciate the need for high quality; their prices are fair and represent good value.



Under the microscope Stumpp & Walter Co.'s Seed Mixtures are shown to be as free from foreign material and weeds as it is possible to make them.

Weeds in Newly Sown Turf

As a premise it is safe to say that weeds will *always* appear with young grass. We ask anyone who has had any experience at all with green-keeping, gardening, or farming what he would expect if he were to prepare a piece of land for seeding up to the point where the seed should be sown, *but not to sow any seed*. Would he expect the land to remain free of plant-life for years after, simply because he had dug the land so carefully, raked it so thoroughly, maybe had worked on it for perhaps several years? Would he expect it to be weed-free? A few days following the first warm shower he would expect to find the seedlings of thousands of weed seeds that are always in soil and are always arriving from surrounding areas. If he still allowed his land to remain untended, he would in the fullness of time have plantains, docks, chickweed, self-heal, and dozens of other weeds in full possession, because soil absolutely free of weed seeds does not exist in territory where plants will grow. Soils may vary as to the quantities of weed seeds they contain, but it is a matter of degree only, and we can describe a soil as "very clean," but never can we describe it as "weed-free."

The weed seeds germinate only when they are sufficiently near the surface, and in cleaning a soil the thing to do is to rake or hoe the land as soon as the weeds appear, which will cause them to die, repeating the work until in time we make the soil *almost* weed-free.

In sowing down new seed, therefore, one must not be disappointed if some weeds appear along with the young



On the beautiful upper course of the Essex County Country Club, West Orange, N. J. Stumpp & Walter Co.'s seeds used.

Weeds in Newly Sown Turf, continued

grasses. And one should not do the obvious thing, which is to at once accuse the seedsman of supplying seed containing weeds: do not do this until you are sure that a similar area not sown would not produce the kind of weeds that are showing in the new turf, and until you have had a sample of the seed analyzed by a competent botanist and the quantities and varieties of weed seeds it may contain reported to you. It is always advisable to keep, for reference, in sealed packages, small representative samples of each kind of seed purchased and sown: if later you have any question in your mind as to the purity of the seed, you are then in a position quickly to decide one way or another. If you find a strange weed introduced into your land, and if your botanist's reports state it is in the seed sample, you have a definite cause for complaint against your seedsman.

Thus, weeds in greens are always to be expected and provision must be made to eradicate them as quickly as possible; but labor is costly, and it is but common sense to give the *maximum preparation* to the land and to sow only seeds of the *maximum purity*. Assume, for the sake of argument, that we have three samples of Blue Grass; one bad, with a purity of 60 per cent; one of fair commercial quality, 80 per cent pure; and one of the highest superfine quality, 90 per cent pure. Taking 1,000 grains from each we would have 400, 200 and 100 grains respectively of impurities. Assuming that but 1 per cent of these impurities are weed seeds (they are generally more), then in every 1,000 seeds of the first we sow 4 weed seeds, of the next, 2, and of the next but one trace, all of which will have to be removed later when in the seedling stage. It is obviously a foolish policy to *intentionally* sow seeds of weeds which later have but to be removed.

Will you conduct the following experiment when sowing seeds?

Prepare a piece of land—the size makes little difference, a space 10 by 10 feet would be ample. Dig it, top-dress it, rake it, fertilize it—just as you treat the seeded portion of your land except *that you sow no seed*. If in the course of a few weeks you are rewarded with a crop of weeds on your newly sown greens or fairway, it will add greatly to your peace of mind to turn to your unseeded patch and find that the same weeds are growing there, and, in consequence, have not necessarily been sown with your grass seeds.

Moss

Turf that is thin and which shows, instead of grass, occasional patches of moss, is frequently met with on almost every golf-course. It is due, generally, to one of two causes: either the soil is waterlogged and sour in consequence, or the soil is so deficient in plant-food that it cannot support grass. If there is no doubt as to which is the cause, attempts should be made to remove it; but if there is a doubt, it is well to assume at first that poverty of soil is the trouble, because it generally is so, and because a process of renovation is much less expensive than a large drainage undertaking, and the results are always beneficial, even if they may be largely of a temporary nature.

How to Eradicate Weeds

Weeds in fallow land are easily destroyed by cultivating or hoeing the soil, and we urge strongly that, before any land is sown down to grass, as long a period as possible be allowed to elapse between the final preparation of the ground and the sowing of the seed, to permit the weeds to grow and to give the constructor an opportunity to kill them. On many soils it is necessary to destroy weeds in this manner quite a number of times before it is anything like clean.

Weeds in roadways, gravel paths, and the like, may be exterminated quickly and economically by means of Herbicide, a chemical which will destroy all vegetation upon which it is poured.

Weeds in existing turf present some of the greenkeeper's hardest problems, and their eradication may be considered under the following headings:

Weeding by the Application of Chemicals Broadcast

This method is based on the principle that many substances have a caustic effect on the leaf of plants, but when scattered on the soil around them will do no harm. Many weeds, particularly those with broad, flat, or hairy leaves, and more especially those with weak fibrous root systems, may be eradicated by this treatment. Climax Lawn Sand is scattered on the turf at the rate of 6 ounces per square yard where weeds are thick; and, where the weeds are not so numerous, a small quantity may be placed on the center or crown of each weed. The shape of the grass leaves permits the Lawn Sand to fall down on to the soil between them and they are not harmed—rather, they are benefited, for the Lawn Sand is in fact a highly concentrated grass fertilizer. The broad, hairy, or flat leaves of most weeds, however, hold and retain the chemical and this burns the leaves. Those weeds which have rather weak root systems are killed when their leaves are destroyed, and in this class may be placed the following:

Veronica, or Speedwell
Chickweed
Young Dandelions

Mouse-Ear
Young Plantains
Moss



The 17th Green, Morris County Golf Club, Morristown, N. J., where the Women's Metropolitan Championship was held, 1922. Grass Seed supplied by the Stumpp & Walter Co. for the past eight years.

Weeding by the Spraying of Chemicals

This method is used by the farmer to destroy charlock or mustard from his wheat, barley, or rye (which are in reality large grasses). Thirty pounds of blue vitriol (powder) are dissolved in 100 gallons of water, and the solution is sprayed on to the whole crop. A very fine mist has to be produced with a spraying machine, and it has to be applied so as to wet thoroughly all the leaves and stems of all the weeds. The grass will be unharmed but many of the seedling weeds will be destroyed. Fifty gallons of the solution would be sufficient for an acre, and it should be used when young grass is about 2 inches high and before the first cutting. This method is not suitable for putting-greens, but it may at times be useful for newly sown fairways on land that is not clean. Annual weeds and seedlings generally may be expected to be destroyed by this method.

Hand Weeding

To remove weeds from established putting-greens, it is advisable to resort to hand-weeding. Crabgrass and goosegrass appear at a time when the schools are on vacation and it is frequently possible to employ boy-labor on this work.

We have just perfected a device that fills a long-felt need in the clearing of turf of weeds; we have named it the "Stumpwall" Weeder. It reproduces in a mechanical way the action of the pocket-knife and thumb of the experienced green-keeper. Note how a practical man slips his knife-blade just under the soil, cutting the root of the crab-grass or star-grass, and at the same time placing his thumb on the weed, drawing it out of the turf, leaving only the smallest bare place that is scarcely noticeable at the time and which heals over almost immediately. The Stumpwall Weeder reproduces this mechanically. A sharp cutting blade cuts the root, and claws grasp the weed. With a minimum of injury to the turf, unskilled assistants, equipped with Stumpwall Weeders, will clear a green of crab-grass in a remarkably short time. They cost \$1.50 each, or \$16.50 a dozen.

We suggest that a putting-green be cleared as follows:

(a) Obtain two lengths of cord as long as one side of the green and with a peg attached to each end. Stretch one of these cords along one edge of the green, and place the other on the green parallel to the first cord and 3 feet from it. Thus, a strip a yard wide is marked off ready to be cleared.

(b) Set a boy at work to remove every weed from this alleyway. Equip him with a Stumpwall Weeder or a Chisel Knife, as offered on page 47. With the Stumpwall Weeder he merely "jabs" all the weeds within reach; if equipped with a Chisel Knife he removes small weeds by inserting the knife close to the weed, grasping the weed with his thumb, and pulling knife and weed out together. Large weeds are removed by inserting the knife about 3 inches away from the weed and about 3 inches deep: pressure on the knife will then cause the soil to crack, when the weed may be lifted out root and all.

(c) Provide a second boy with a pailful of dry, screened compost or clean soil, mixed with 5 pounds of grass seeds. Instruct him to follow his partner and fill each hole with the mixture, pressing down with his foot.

(d) Inspect the cleared alley.



THE STUMPWALL WEEDER

Patent applied for. Price, \$1.50 each, \$16.50 per dozen.

(e) Remove the outer cord and place it parallel to the second cord, but 3 feet nearer the center of the green. Set the boys at work on the second alleyway thus formed.

Hand Weeding with Chemicals

Take a jar of sulphuric acid (commercial strength), and a number of thin "slivers" of hard-wood. Place the jar in front of you and dip a sliver into the acid a short way only and then jab it into the center of the weed. Continue this until every weed within reach has been treated: move along and treat the next area until the whole green has been treated.

Killing weeds in this way is cheaper than hand-weeding, but we find the dead weed causes a bare patch which takes some little time to heal, the soil having been sterilized, whereas with the hand-weeding process the weed is removed, pure grass seeds are put in its place, and in a few days the turf heals.

Rolling

Generally speaking, very light land may be heavily rolled with impunity at any time, except when wet. Heavy soils may be rolled with a light roller occasionally; also only when the soil is dry. The question as to what is a light and what is a heavy roller is a matter of experience to decide. Taking a roller which rolls a path 5 feet wide, anything like 1,000 pounds would be light; anything beyond 1,500 pounds would be heavy. In hand-rollers, taking as an example one that is 2 feet wide, 200 pounds would be light and 400 pounds would be heavy. Within these limits, the green committee can readily determine the kind of roller best suited for their greens. In addition to rollers of this type, a putting-green is much helped by passing over the surface a very light wooden roller. The work this does is entirely confined to the grass and to the barest surface of the soil.

Seed Samples

We prepare samples in glass vials for permanent reference of those grasses which are in general demand for golf-course purposes. It will be a pleasure to send one of these sets to the chairman of your green committee on request.

We are prepared to advise personally with you on your turf difficulties, a service which has been a feature of our business for the past ten years



The Fourth Green, Cedar Point Golf Club. Seed and Fertilizer supplied by Stump & Walter Co. Seeded September 9, 1924; playable forty days later.

Stump & Walter Co.'s GOLF TURF



The Seventh Green, Canoebrook Country Club, Summit, N. J., where the Metropolitan Open Championship was held in 1923.



The Ninth Green, Siwanoy Country Club, Mt. Vernon, N. Y., where the Metropolitan Amateur Championship was held in 1923.



The Fifteenth Green, Essex County Country Club, West Orange, N. J., where the N. J. State Amateur Championship was held in 1923.



The Eighteenth Green, Inwood Country Club, Far Rockaway, L. I., where the U. S. G. A. Open Championship was held in 1923.

Photographs by Levick

Four metropolitan courses prominent in golf events during 1923. In each case seeds supplied by Stump & Walter Co.

Mowing

During the spring and fall, on a course in good condition, it is frequently found necessary to cut the greens daily; on others every two days is the rule. Close cutting tends to the production of "fast" greens, while a longer growth of grass slows the ball considerably.

We suggest that the greens be cut quite closely during the cooler months of the year, but, during June, July, and the first part of August, it is a good plan to let the grass lengthen somewhat and so do something to avoid burning.

The question as to whether the cuttings should or should not be left on the turf is a much-discussed one. We lean to the side that machines should be furnished with catchers, and the clippings removed every time. It is true that to leave them on the greens is to return to the soil something of what the plant has taken out of it, but a long process of decay has to take place before the small amount of nitrogen and other plant elements that are in the leaves will be in a fit state for the plant to again take advantage of them, and

this decomposition can best be carried on in the compost heap.

Newly sown grass on the putting-greens should be clipped with a well-adjusted machine as soon as it is 2 inches high, while that on the fairways should be cut when it is 3 inches high. Later the machines may be gradually adjusted down until the grass is cut to the length preferred.

Cutting grass induces the production of fresh shoots, and the more grass is cut the more it "tillers" in this way, until the newly sown grass ceases to be a collection of individual plants and becomes a tough matted mass.

It is poor economy to purchase cheap mowing-machines. A high-grade, ball-bearing mower outlasts by many times the cheaper outfit; its adjustments are more easily made and are more easily maintained; a slight misadjustment will pull out grass plants in the same way as a hair-clipper in the hands of a careless barber will tug one's hair. For the greens we advise the Aristocrat or Pennsylvania Roller Mowers.

Stump & Walter Co.'s GOLF TURF

Most of the advertised makes of fairway mowers are economical in operation, and in tractor-mowers the Worthington or the Toro combinations do good work. The Ideal for smaller areas is also satisfactory, as is also the Four-Acre Mower.

The several machines listed on pages 50 to 52 are all good. They are of such simple construction that a break-down is rare.



A shaded turf, although beautiful to look upon, is sometimes difficult to obtain. It calls for a well-drained, porous soil, correct varieties of grass seeds, and frequent top-dressings.

Shaded Greens

When building a green close to trees it is essential in the construction work to see that the green is so graded that all surface water is led away quickly.

In these greens, above all others, a well-prepared soil is necessary, the top 4 inches specially made up of 30 per cent sharp sand and 70 per cent good top-soil, with a ton of charcoal worked into the surface. A quantity of these materials should be passed through a ¼-inch rotary screen to make the final surface, and the green should be sown with a mixture of seeds in which South German Bent, Chewing's Red Fescue, and Rough-stalked Meadow Grass are used in equal proportions. We can supply such a mixture at 70 cts. per pound.



At the Greenwich Country Club, Greenwich, Conn., where the Women's Metropolitan Championship, as well as the Metropolitan Open, was held in 1920. Grass seed for this course supplied by the Stump & Walter Co.

Winter-kill

On almost every northern golf course, in the spring when growth has commenced, bare patches here and there will appear. On some courses there are not many of them; on others, the total bare area is quite large. Happy is the greenkeeper who has a course which does not suffer materially from winter-kill. From our experience, we find that the chief cause of these bare patches is the collecting, in depressions and pockets of the turf, rainwater or water from melting snow. The condition of the soil does not allow this water quickly to get away, and a drop in the temperature converts it into solid ice. This cake of ice, in the late winter, freezes hard at night and partly melts during the daytime, and it is this freezing and thawing at the end of the winter which is the cause of most winter-kill. The only radical cure is a system of drainage, so altering the configuration of the greens that surface water readily drains away, or by insuring with under-drainage that all excess moisture disappears the moment it collects. The usual spring treatment of these winter-kill patches is to rake thoroughly the soil, add a 1-inch layer of compost, again rake, then sow a small quantity of seed. The amount of seed required is usually figured at the rate of 1 ounce per square yard of bare land.

On a vegetated Bent green, instead of seeds, some clipped stolons would be broadcasted.



Showing the method used at Canoebrook, N. J., to protect greens against winter-kill. A layer of leaves, held in place with birch branches. Stump & Walter Co.'s seeds are used on this course.

Scott North, professional at Saranac Lake Club, protects all his greens with splendid results. He places young evergreen trees and branches in a position to cause a drifting of snow over the entire green to a depth of about 2 feet. Such a method is only 100 per cent effective in a section with a heavy snowfall, and it would be difficult to follow where evergreen trees are scarce.

Isaac Mackie, professional at Canoebrook, uses dead leaves, held in place with birch saplings and branches, on those of his greens which ordinarily winter-kill every year. With this protection he carries his greens through perfectly.

It would seem unnecessary, but recent inspection of some courses compels us to advise: *On no account team or run tractors over putting-greens, winter and hard frost notwithstanding.*

Turf Versus Seed

The usual experience is that newly sodded ground never afterward looks so well as it looked on the day it was laid. The chances are in favor of purchased sod having been produced on very different soil to that on which it is placed, and, in consequence, the varieties of grass which comprise it are those which will not succeed in their new surroundings. Our suggestion to a club is, therefore, never to purchase sod from outside for construction or repair work.

Turf Nurseries

The production of sod on your own course, however, for occasional repairs is quite another matter, and we strongly urge upon green committees the advisability of always possessing a turf nursery, where a tract of grass is made with as much care and thought, as a new putting-green, and the turf rolled, mown, top-dressed and otherwise tended as any of the greens. Such an area could well be utilized in many cases by the professional for instruction, or as a practice-green. When sod is needed for the repair of greens and tees, a supply is thus available consisting of just those varieties that are natural to your course, and patching can thus be undertaken or even new greens constructed with the material right at hand. Such a nursery may be sown with seed or planted with Bent stolons.

A hole-cutter will be found very useful for slight repairs. A few discs can be taken out of a green from the center of clover patches, say, or from worn or weedy spots, and immediately similar discs of fine turf can be transferred into their places from the turf nursery.

Laying Turf

When transplanting sod for repairs or for construction work, the following should be carried in mind:

The turf should be of uniform thickness; 1½ inches is sufficient.

The turf should be taken from a situation exactly similar as regards moisture, aspect, shade, and soil to that on which it is to be laid.

The land should be prepared with thoroughness and some fertilizer worked into the surface.

The turf should occupy the minimum amount of time between its lifting and relaying.

The turf should be "tamped" firmly onto its new bed.

The turf should be "cemented" into place by rubbing into all cracks and crevices a mixture of soil, compost, or rotted manure and seed.

Plenty of water should be given after sodding.

The months of June, July, and August should be avoided for this work if possible.

One and one-half to 2 inches of soil and grass roots is a good thickness to which to cut turf, and a good idea is to aim to lift them a trifle thicker than this, and to prepare a wooden tray of a size exactly to hold the sods: nail sides on to three sides of this tray exactly 1½ inches high inside measurement. Prior to setting the sods, place each one in the tray, grass side downwards, and shave off excess soil and roots by means of a scythe blade, resting each end of the blade on the sides of the tray when cutting: draw the blade toward you, and arrange the tray on a suitable stand with the fourth or open side away from you.

Prepare the soil just as carefully, although perhaps not quite so deeply, as for sowing seed. At least a 2-inch layer of top-soil should be added, and to this five loads per green of spent mushroom soil or rotted manure may be added, and the whole worked together. Dust on each green 150 pounds of Emerald Grass Fertilizer, and rake with a view to distributing this fertilizer and to prepare finally the land for the reception of the sods. Do not walk unnecessarily upon the newly sodded area, and it is a good plan to lay planks upon which to carry or wheel materials.



Fine-leaved
Sheep's Fescue

Chewing's Red
Fescue

Hard
Fescue

Sweet
Vernal

Velvet
Bent

Red
Top

Kentucky
Blue Grass

Wood Meadow
Grass

Perennial
Rye Grass

SOME GRASS PLANTS AS GROWN ON THE STUMPP & WALTER TRIAL GROUNDS



Home Green and Club-House at the New Course, Greenville Country Club, Greenville, S. C. Grass seed supplied by the Stump & Walter Co.



The Eleventh Hole showing Fairway and Green on the beautiful Mid-Ocean Course at Bermuda. Fairways are of Carpet Grass and Greens of Bermuda Grass (seeded). Winter Turf of Rye Grass and Red Top. Grass seed supplied exclusively by the Stump & Walter Co.

Turf in the Southern States and Tropics

If a map of North America be taken and a pencil-line drawn along the southern boundaries of the states of Virginia, Kentucky, Missouri, Kansas, Colorado, Utah, and Nevada, one may roughly say that the Fescue grasses, Bents, Blue Grass, and Red Top are suitable only for permanent turf conditions north of the pencil-line. It seems that the further north one goes, and the more severe climatic conditions become, the more luxuriant is the growth of these grasses. One cannot but be impressed with the wonderful carpet-like turf on many courses in the Adirondack Mountains, Green Mountains, and in the Dominion of Canada. South of our pencil-line, however, it is generally wasted labor to endeavor to obtain fine permanent turf with these cold-loving varieties. Instead, an entirely different principle governs the production of turf in the South. While in the North our efforts are directed toward a permanent and ever-improving turf the season through, *in the South we aim to produce two distinct turf crops, every twelve months.* On southern putting-greens, in the summer we endeavor to have a dense mat of Bermuda Grass, in the winter we play on seedlings of Rye Grass or Red Top, the seeds being sown so thickly, and the resulting seedlings being so crowded together that they form a dense turf.

Bermuda may be planted or "vegetated" by inserting portions of the stems or runners into the soil a few inches apart, or seed may be sown; in either case, about corn-planting time. During October and November, Bermuda, which is a vigorous growing perennial, loses its deep green color, becoming dried, white, and hay-like as it enters its winter dormant stage. At this time a heavy top-dressing should be given and then seeds either of Italian Rye Grass alone or of Italian Rye Grass and Red Top are sown freely. In a short while a bright green turf is obtained, which serves its purpose until spring, when the increasing temperature causes it to disappear, and the Bermuda, which has been dormant all the winter, to awaken into life.

It is absolutely necessary that the Italian Rye Grass, or Red Top, be resown thickly every autumn, but the Bermuda reappears every spring of its own accord. For best results, however, it is frequently desirable to include a light seeding of Bermuda with the April top-dressing, for the crowding

caused thereby tends to keep the Bermuda turf plants less luxuriant and finer in the leaf.

Bermuda Grass has a marked tendency to throw its runners up above the surrounding sod, and the monthly top-dressing recommended for northern conditions is even more necessary with a Bermuda turf in the South. One or two cubic yards of compost, passed through a rotary soil-screen, and with 50 pounds of hydrated lime added, should be applied to each green every month during the hot weather. Top-dressing is generally withheld on the seedling turf of Rye grass or Red Top during winter.

While Bermuda is the most satisfactory grass for southern putting-greens, and for fairways also when they are on dry ground, a better fairway grass for wet soils in the southeast is Carpet Grass. It is frequently advantageous to sow both Bermuda and Carpet Grass together, with the idea that the variety which is best adapted to the conditions of soil and moisture will eventually predominate. Carpet Grass is altogether too coarse for putting-greens.

As to rates of seeding, Bermuda Grass, or Carpet Grass, alone may each be sown at the rate of 5 pounds per 1,000 square feet on small areas, or in the case of Bermuda about 25 pounds per average green. Much less than this proportion may be used on fairways, 50 pounds per acre being an effective allowance; even this is a much heavier seeding than a southern farmer would use, but heavy seeding results in a crowded turf, which in turn tends to produce finer growth. If Carpet Grass and Bermuda Grass be sown together, use 25 pounds of seed of each to the acre.

For the winter turf, Italian Rye Grass alone is usually used at the rate of 50 pounds, or even more, on an average size putting-green and 150 pounds or more per acre on fairways. If Red Top is used in mixture with it, use one-third Red Top and two-thirds Italian Rye Grass, employing the above approximate quantities of 50 pounds per green or 150 pounds per acre.

It must be remembered that a 1,000 feet of elevation is equivalent to a distance of many miles toward the north, and courses in mountainous sections in the South very frequently obtain the best results with northern grasses.

The Mechanical Nature of Soils

Most varieties of grass thrive best in soil of a *medium* texture. We all know a clay soil: one which sticks to one's shoes when wet, and becomes of the nature of concrete when dry, and, we are all familiar with a truly sandy soil, one through which rain will quickly disappear, and which, when dry, will sift easily through the fingers when held in the hand. Midway between these two extremes is found a *medium loam*, and if it errs a little on the sandy side, we call it a *sandy loam*; if it contains more clay than sand, we call it a *clay loam*. Soils which contain a preponderance of clay—clay loams—are also termed *heavy soils*. Those which contain a large quantity of sand—sandy loams—are known as *light soils*.

During the course of years, plants have grown and have died on the soil in question. Animal life of all kinds, too, has existed there, and these remains, vegetable and animal, contribute another ingredient to the top 9 inches or so of soil. These remains, in a decayed form, are known as humus, and where they form a major part of the soil, the soil is termed "muck land."

A medium loam is the best land for a golf course. A sandy soil can very quickly be brought into shape; heavy land is difficult to handle, however, and muck land is almost impossible, from a golfing point of view.

In preparing land for grass, one of the most frequent sources of error is to plow or to dig the land so deeply that the top-soil is placed at too great a depth and some of the subsoil, that is to say, the layer next under the top-soil, has been brought to the surface, covering the true growable soil. Subsoil is very frequently deficient in humus and also in plant-foods, and by thus cultivating too deeply it is possible to commence the construction of the course with the handicap of a poor, worthless soil, while a good growing soil has been buried a few inches below the surface. Good soil, buried to a greater depth than 4 inches, is practically lost to grass, for it is very exceptional for the roots to penetrate more than 4 inches into the soil. In the construction of both greens and fairways the conservation of the top-soil is a matter of the fullest importance.

Drainage

Land that is soft and soggy at times, when other portions of the course are dry; land which, on test, invariably gives an acid reaction; land on which sedges, rushes or wild iris are found luxuriating—all such land needs tile-draining.

Tile-drainage is simple, provided care is taken to see that all the pipes that are laid have a steady and gradual fall to their outlet. A main trench should be dug, running from the affected area by the shortest route to a ditch, river, water-hazard, or trap. Radiating from this, further ditches may be dug in the affected area. These ditches should be as straight as possible, and the branch should not meet the main trenches at right angles, but preferably at an angle of 45 degrees, to ensure an even flow of water. Branch ditches should join the main ditch separately; in other words, the branch on the right and the branch on the left should meet the main ditch at different points. In the main ditch a row of 4 or 5-inch drain-tiles (the size refers to the diameter of the pipe) should be placed. They should be closely laid, end to end, but no attempt is to be made to cement the joints. It is largely through the open joints that the water enters the pipe from the surrounding soil. For the branch ditches, drain-tiles 3 or 4 inches in diameter are usually used, and these should be similarly laid, end to end. Where the branches meet the main drain, it is advisable to insert in the main drain a length of branch or "Y" section of glazed sewer pipe, cementing it to the sections of both main drain and lateral drain, and thus affording an uninterrupted flow of water, both through the main and from the branch into the main. A commencing depth of $1\frac{1}{2}$ feet under the surface for the branch drains is usual, and a steady fall in the system determines the depth of the other pipes. After being laid in the bottom of the trenches, it is a good plan to at first put a layer of straw, waterproof paper, or stones on top of the pipes, then return the subsoil, and finally the top-soil.

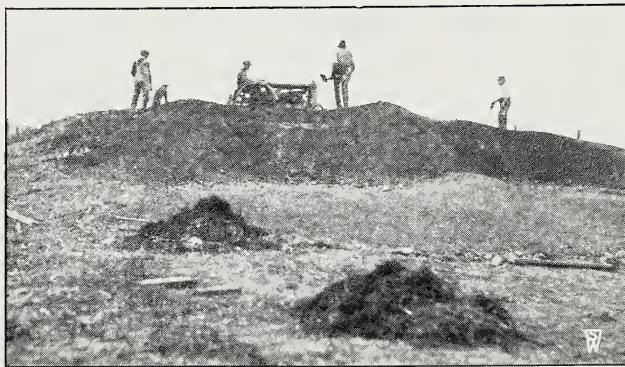
A screen of wire netting over the outlet for the drain is necessary to prevent moles, rabbits, rats, field-mice and woodchucks from entering the tiles and choking the system.

Where an outlet, as suggested above, is not available, it is sometimes possible to dig a large well or tank into which the drainage pipes may be run, and which, when all the tiles are laid, may be filled with rocks, building rubble, and clinkers. Sometimes the land is so wet that even this cannot be dug without it continually filling with water. In this case, there is nothing to do but devise some mechanical means whereby the water from such a well could be siphoned out.

In many cases the disposal of surface water is alone sufficient to clean a stagnant piece of land, in which case a series of wide, shallow depressions may be run, with a gradual fall, to an outlet, making the work more of a grading job than one of trench-digging. Further, a wet, soggy depressed patch may frequently be corrected by dumping a few loads of earth upon it, turning it into a slight hillock instead of a depression.

INSPECTION OF GOLF COURSES

A part of our service is to make personal inspections of golf courses and advise with you on the , round. Frequently we can arrange to do this without cost to you—we suggest that you write us.



An unusual construction scene in New York City: building traps on the new "Subway" Golf Course, situated in Brooklyn, centered amid a two and a half million population.

The Manure Problem

Time was when the farmer, bringing his produce to market, would, for a consideration, remove and dump on his land the horse-manure accumulated by the city horse-owner. Later he was glad to remove it without cost, and now, with horses becoming fewer and fewer, manure is mounting higher and higher in value. Few good farmers can be induced to sell manure, and the club is usually forced to go farther and farther away for its supplies. With the disappearance of the horse, and with increasingly efficient methods of garbage destruction in cities, there is a possibility that the supply of manure may cease altogether for all practical purposes.

We are still in a position to quote on car lots of Horse-Manure. For limited areas, Pulverized Sheep-Manure is a satisfactory substitute for rotted stable-manure. In this case the droppings of sheep in the stockyards are collected, subjected to sufficient heat to drive off moisture and to kill weed seeds, and the material is then practically in a powdered form. This, after it has been applied, very quickly reabsorbs moisture, and its bulk is thereby increased.

Shredded Cattle-Manure is a highly concentrated animal manure which is also of value in this way, but artificial fertilizers will not take the place that animal manure occupies in green-keeping; chemical and desiccated animal manures are a splendid adjunct, but are in no sense a complete substitute.

The real solution to the manure famine, however, is very simple: it is no less than, *with the aid of fertilizers*, to grow a bumper crop of some bulky material and, with the addition of some more fertilizer, to plow it under the soil where it will speedily decay. Such a process increases enormously the vegetable matter in the soil, improves its texture, and increases its water-holding capacity; it adds and retains valuable plant-foods; it helps to clear land of weeds; and it solves the manure problem.

There are a number of plants which lend themselves to this purpose in that they are quick-growing and bulky and their seeds are inexpensive. Generally, it is best to select

some one of the legumes because all plants of this family (peas, beans, clover, etc.) have the well-known property of absorbing the free nitrogen which is in the air around us and, with the aid of bacteria, converting this nitrogen into nitrates. Thus, a plowed-in crop not only adds considerable bulk of vegetable matter to the land but it actually increases its fertility through the additional nitrates which are added to the soil. Note that this work is performed with the aid of soil bacteria, which are usually in the soil in sufficient numbers to do the work quickly; in the event that they are not, it is always a safe insurance to *inoculate the seed* of all legumes before sowing with the necessary nitrogen-fixing bacteria. (We offer at foot of this page suitable cultures of these bacteria under the trade name of "Farmogerm.")

Having inoculated the seed and prepared the land for seeding, we recommend that some chemical fertilizer be applied, such as acid phosphate, bone meal, or the like. (See the table elsewhere in this book.) Then scatter the seeds broadcast at the rates indicated on page 10, harrow in lightly, and roll. A good time to plow is just before the land is wanted for seeding to grass, unless the land is foul with weed seeds, when a period during which the land may lay fallow is desirable; but in any case, it would be a good plan not to allow the crops to reach such a degree of maturity that they seed; if it is still too early to sow grass, plow in the cover-crop when it is in flower and before it has ripened its seeds. In plowing, let the furrow be as shallow as possible consistent with completely inverting the sod. Attach chains to the plow if it is found necessary.

After plowing, a dressing of our Fairgreen Fertilizer may be given at the rate of 1,500 pounds per acre, the land then harrowed and sown down with grass seeds. Cover the grass seeds by means of a bush harrow lightly drawn over the land, and roll.

We suggest that when constructing a golf course, or undertaking any other agri-horticultural proposition it is a good plan not to allow even the smallest amount of land to remain idle. It is an excellent idea to allow a cover-crop to stand over the winter, say rye or wheat or winter vetch, or, better still, a combination of all three.

Farmogerm

Supplies the nitrogen-fixing bacteria necessary for the successful growth of Field Peas, Vetches, Soy Beans, and Cow-peas. Separate cultures are offered for each of the above; state for which crop required.

Garden size	\$0 50
1-acre size	1 00
3-acre size	2 50
12-acre size	9 00

Charges prepaid



At the beautiful Piping Rock Club, Locust Valley, L. I. Grass seed supplied by the Stumpp & Walter Co.

FUNGICIDES, INSECTICIDES, AND SUNDRY CHEMICALS

Ammoniated Copper Solution. An excellent preventive of the Brown-Patch Fungus in putting-greens. Spray weekly if an attack is feared. Mix one gallon of the solution with 40 gallons of water. Gal. \$4.

Arsenate of Lead. Powder. Recommended occasionally for cutworms. Lb. 50 cts., 5 lbs. \$2.25, 10 lbs. \$4, 50 lbs. \$15, 100 lbs. \$27.50.

Arsenate of Soda. For field-mice. Dissolve 2 ounces in 1 quart of water, and moisten bran and sugar with the solution. Lb. \$1.

Bichloride of Mercury (Corrosive Sublimate). A deadly poison. Occasionally recommended for killing earthworms. Keep it under lock and key. "Vermol" is safer and equally effective. Lb. \$2. Special quotations on quantity.

Black-Leaf 40. A concentrated solution of nicotine sulphate; an excellent spray for the lice which appear on shrubbery. Dilutes one part to 900 or 1,000 parts of water, according to treatment. Full directions on each package. 1/2-lb. tin \$1.25, 2 lbs. \$3.50.

Blue Vitriol Powder (Copper Sulphate). Lb. 35 cts., 5 lbs. \$1.50, 10 lbs. \$2.75, 25 lbs. \$5.75, 50 lbs. \$10, 100 lbs. \$15.

Bordeaux Mixture, Dry Powder. One of the best fungicides known, on account of its metallic copper. Copper in this form stimulates the growth of plants on which it is applied, acting as a tonic. Bordeaux Mixture is the recognized fungicide for the control of most fungous diseases. Apply dry or dissolve 4 pounds in 50 gallons of water. Lb. 40c., 5 lbs. \$1.50, 10 lbs. \$2.75, 25 lbs. \$5.75, 50 lbs. \$10, 100 lbs. \$18.

Calcium Arsenate. Known for its high arsenic content. It is probably the most effective arsenical insecticide on the market. Lb. 40 cts., 25 lbs. \$7, 100 lbs. \$21.

Calcium Cyanide. Recommended for the destruction of large white grubs, crayfish, etc. A teaspoonful of Calcium Cyanide is placed in each burrow; close the hole with soil and tamp solid. 25 lbs. \$10, 100 lbs. \$30.

Carbon Bisulphide. Gives off a gas which is fatal to ants, grubs, and earthworms. Although a poison and highly inflammable, is safe if reasonable care is used. Will kill grass, hence must be introduced into the soil through a special funnel as shown elsewhere in this book. Lb. can 75 cts., 100-lb. keg \$30.

Climax Lawn Sand. This is by far the best preparation for eradicating weeds from existing turf. It will not destroy established perennial weeds such as dandelions or plantains, crab grass, etc., but it will kill young dandelions, young plantains, together with those annual weeds which have a fibrous root system, such as chickweed, mouse ear, veronica, also moss. Further, it feeds the grass, and we recommend its extended use. For areas heavily infested with weeds, we advise that the Lawn Sand be scattered over the turf at the rate of six ounces per square yard, while for individual weeds, a small quantity, say a spoonful, placed on the crown of each weed will very quickly destroy it, and will stimulate the surrounding grass, so that the patch left by the weed very quickly heals. 7-lb. can \$1.25, 14-lb. can \$2, 28-lb. pkg. \$3.75, 56-lb. pkg. \$7.25, 140 lbs. \$14.

Fish-Oil Soap. Will control many of the insect pests that attack plants; of value to the greenkeeper as a means whereby Carbon Bisulphide may be worked up into an emulsion for control of the small white grub. Lb. 25 cts., 5 lbs. \$1.10, 10 lbs. \$2, 100 lbs. \$15.

Formaldehyde. An effective and widely known fungicide and germicide of occasional value for turf. Fluid pound (pint) 50 cts., 60-lb. keg \$18.

Herbicide. For destroying weeds in roadways, paths, and gutters. Fatal to grass and other plants, including weeds, but does not injure stone, woodwork or the shoes of the person applying it. One gallon of Herbicide mixed with forty gallons of water is sufficient for 100 to 150 square yards of roadway. Qt. 70 cts., 1/2-gal. \$1.20, gal. \$2, 5-gal. keg \$8, 10-gal. keg \$15, 30-gal. cask \$33, 50-gal. bbl. \$50.

Kerosene Emulsion. Occasionally recommended as a spray for putting-greens infested with white grub. Contains 80 per cent kerosene. Dilutes 1 part to 15 to 35 parts of water. Qt. 75 cts., gal. \$1.75, 5 gals. \$7.

Lime-Sulphur, Concentrated. For spraying trees to destroy San José scale. One gallon makes ten gallons of spray; dilute with cold water. Qt. 50 cts., 1-gal. can \$1.25, 5-gal. can \$4.25, half-barrel (about 25 gals.) \$8, barrel (50 gals.) \$14.

Paris Green. A well-known poison occasionally demanded when a green is infested with cutworms. Mix 5 pounds with 50 pounds of moistened bran and scatter on the green after play is over for the day. Brush up and remove next morning. Lb. 60 cts., 5 lbs. \$2.75, 14 lbs. \$6.50.

Powdered Sulphur. Twenty-five pounds per green of this, dusted over the turf is frequently advised for warding off an attack of fungus. Lb. 25 cts., 5 lbs. \$1, 10 lbs. \$1.60, 100 lbs. \$12.

Reade's Electric Worm Eradicator. Liquid. For eradicating earth worms 1 gallon is diluted with from 200 to 250 gallons of water, and the turf thoroughly drenched. Four gallons of the concentrated material is the average allowance for a putting-green. 5 gals. \$17.50, 10 gals. \$34, 50 gals. \$150.

Semesan. Powder. Recommended for the control of Brown Patch. The turf is first drenched with a solution of Semesan and afterward it is either sprayed with the solution or dusted with dry Semesan. One pound of the powder is dissolved in a 50-gallon barrel of water, and this solution is applied at the rate of 5 quarts per square yard to the affected areas, using a watering can; this drenches the turf. Later, at intervals of ten days, the turf is sprayed, using 1 gallon of the solution to each 25 square yards. If preferred, the powder may be dusted on dry instead of spraying, using 1 pound of the powder per 1,000 square feet. The quantity of Semesan required for the first drenching de-

pends upon the extent of the infected areas; the subsequent spraying or dusting should be over the entire green, when 4 pounds of the powder in solution should be allowed to each average green, and rather more is required if the powder is put on dry; in this case allow 5 pounds to each average green. Lb. \$2.75, 5 lbs. \$13, 25 lbs. \$62.50, 350-lb. bbl. \$822.50.

Sodium Cyanide. Powder. For small white grubs 7 ounces dissolved in 50 gallons of water should be applied to each 200 square feet; this quantity will destroy most of the grubs without injuring the grass. Lb. 75 cts., 100 lbs. \$45.

Sulphide of Potassium (Liver of Sulphur). An efficient fungicide which has been recommended for the control of Brown-Patch. All sulphides are likely to injure grass if applied unwisely; therefore experiment on an area of unimportant turf before applying to a putting-green. Dissolve 3 ozs. in 10 gallons of water and apply to the grass in the form of a fine spray. Lb. 50 cts.

Sulphuric Acid. Commercial strength. Occasionally used as a weed-killer. Extreme care in using this material is necessary. Fluid pound 75 cts., 9 lbs. \$3.

Tobacco Dust. Occasionally recommended to mix with Scotch Soot and apply to turf to ward off the May and June beetles, forerunners of white grubs. 100 lbs. \$6.

Tobacco Stems. Sometimes used by greenkeepers as a dressing for putting-greens. Bale of 100 lbs. \$4.

Vermol. Powder. The most efficient destroyer of earth worms. Broadcast at the rate of 1/2 pound to the square yard, (250 pounds to the average putting-green), and should be applied during dull, warm, muggy weather and during the early morning or evening. It is absolutely effective, but is harmless to man and animals, and will not injure the turf; it is non-poisonous. There is practically no limit to the quantity of water which may be used to wash Vermol into the soil. 1/4 ton \$27.50, 1/2 ton \$50, ton \$95.

DISTRIBUTING APPARATUS

These are illustrated on pages 42 to 56 of "Golf Turf"

SPRINKLER BARREL. For applying solutions over small areas and—Combination No. 2—for spraying.

Combination No. 1. This consists of a 50-gallon barrel mounted on a strongly made truck. A sprinkler is attached, by means of which liquid manures and various chemicals may be watered on to turf. A convenient 50-gallon watering-cart. Price, \$35.

Combination No. 2. The above outfit with a high-pressure spray pump attached to barrel, producing a mist-like spray, with sufficient rubber hose to enable any part of an average green to be sprayed from the side. Price, complete, \$60.

KINNEY WATER-PRESSURE PUMP. A small but very valuable device for applying liquid manures, such as ammonium sulphate in solution. The pump is attached to the

sprinkler hose, a second tube is dropped into a barrel containing the fertilizer solution, which may be prepared at double the strength usually used. A third section of hose is attached to the outlet of the pump; this is the discharge pipe. On opening the faucet the water-pressure does the pumping and dilutes the liquid manure approximately one-half. The Kinney Pump is economical as to labor and time when compared with the usual method of applying liquids through watering-cans, and a much better job can be done with it. Price, solid brass, \$3.

SAVAGE DUSTER GUN. Made expressly to dust any dry powdered insecticide or fungicide. Will dust evenly and stand hard wear. Can be adjusted to discharge from 2 1/2 to 20 pounds to acre. Price, \$20.

WHEELBARROW SEEDER AND DRY POWDER DISTRIBUTOR. We recommend this practical machine for sowing grass seeds and broadcasting dry Bordeaux and other powders. Two hoppers, each 14 feet in length; one is for sowing seeds and the other is to enable the machine to distribute Bordeaux or fertilizers. Price, complete machine, both as seeder and powder distributor, \$27.

FUNNEL AND SKEWER. Specially designed for applying Carbon Bisulphide through the turf into the soil. Carbon Bisulphide will burn grass, hence it is necessary to employ a device of this nature to convey it through the grass down into the soil. \$1.50 each.

KNAPSACK SPRAYER. Recommended for spraying Bordeaux Mixture and other solutions on putting greens. Holds four gallons. A few strokes of plunger compresses enough air to cover half a putting-green.

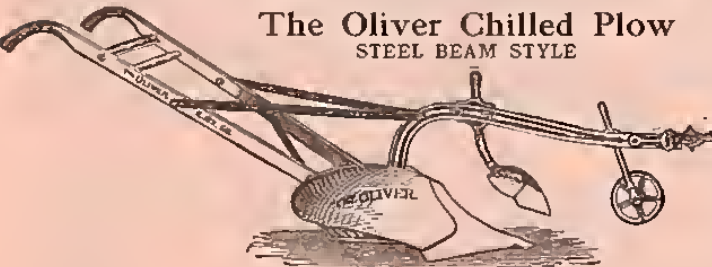
Auto-Spray No. 1B, Brass Tank, with "Auto-Pop" Nozzle, \$9.50.
Auto-Spray No. 1D, Galvanized Tank, with "Auto-Pop" Nozzle, \$6.50.

WATER-CART. For applying solutions of Semesan, Sodium Cyanide, Bisulphide Emulsion, Worm Eradicator, etc., over wide areas.

No. 1, capacity 175 gals., one-horse.....\$200 00
No. 2, capacity 450 gals., two-horse..... 595 00
No. 3, capacity 600 gals., two-horse..... 650 00

The Oliver Chilled Plow

STEEL BEAM STYLE

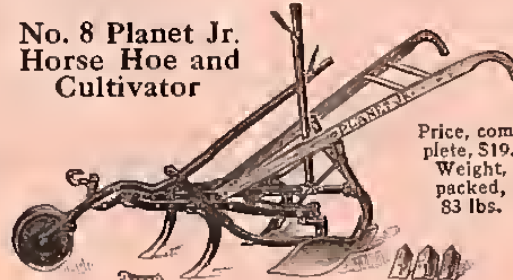


The Oliver Plow is adapted for clays, sands, or stony soils. As a general-purpose Plow it is acknowledged to be the best. Made in one-horse and two-horse sizes, with steel and wood beams.

	Capacity	Steel Beam	Wood Beam
No. B-C One-horse, light.....	5 x 10 in.	\$12 75	\$12 00
No. 10 One-horse, heavy.....	5 1/2 x 11 in.	16 00	16 00
No. 19 Two-horse, medium.....	6 1/2 x 12 in.	19 50	19 50
No. 20 Two-horse, medium.....	7 x 13 in.	21 00	
No. 82 Two-horse, light.....	7 1/4 x 13 in.	19 75	
No. 83 Two-horse, medium.....	7 1/2 x 14 in.	21 50	
No. 84 Two-horse, heavy.....	9 x 16 in.	24 50	

Plows with wheel, add \$2.25. Plows with jointer, add \$4.50.

No. 8 Planet Jr. Horse Hoe and Cultivator



Price, complete, \$19.
Weight, packed, 83 lbs.

No other cultivating machine is so widely known as the Planet Jr. Combined Horse Hoe and Cultivator, for it is in use throughout the civilized world. It is so strongly built as to withstand incredible strain, yet it is light and easy to handle. This implement is excellent for the periodical cultivation of fallow land prior to seeding. The longer a fairway is allowed to remain after plowing and finally seeding and the more it is cultivated during that period, the fewer weeds will be in your final turf, and the soil will have been brought into the best possible condition.

LIME AND LIMAG

There are four imperative reasons for the use of Lime:

It is one of the essential food elements of plants.

It has the property of unlocking other food elements in the soil.

It sweetens and makes fertile soils that are acid, decomposing the humus or organic matter in the soil.

It corrects the mechanical condition of land, tending to lighten soils that are heavy and sticky, and tending to bind soils that are light and sandy.

Lime strengthens the internal structure of plants, increases root-production, and aids in the production of starches and sugars. Lime warms the soil. It is needed in moderate quantities by most grass and clover lands.

HOW MUCH LIME TO USE

On land that is not at the time carrying a crop, you may use from one ton to three tons to the acre, the heavier the land the more freely, as a rule, does one apply Lime: do not apply more than one ton at a time to sandy soils. For sweetening pasture fields or grass land generally use one-half the above quantities.

Lime may be applied at any time to land that is not being cultivated, generally after plowing or digging and before harrowing or raking. It may be used on grass or clover in the winter, spring or fall—not during summer. We offer Lime in three forms, as follows:

LIMAG. A combination of lime, magnesia, and potash. While it produces the same results as limestone or hydrated lime—supplying the essential calcium, unlocking other soil elements, sweetening and mechanically correcting the land—it has some remarkable additional advantages: it destroys soil pests, grubs, wireworms, and such like; it discourages fungous diseases; it adds to the soil not only calcium, but potassium and magnesium—also required by plants. Use Limag on plowed land or as a winter top-dressing for turf at the rate of 1,000 pounds to 3 tons per acre, according to need. 100 lbs. \$3, 500 lbs. \$12.50, 1,000 lbs. \$22.50, ton \$40. Carload lots at \$30 per ton, f.o.b. shipping point.

PULVERIZED LIMESTONE. Made from the purest crystalline, white limestone obtainable, and has many advantages over burnt or caustic Lime. Not being caustic, it does not burn the humus in the soil, and may be used almost any time of the year without danger. It is good for all crops, especially for the successful growing of grass, and, owing to its extreme fineness, admits of very even distribution. 100-lb. bags \$1.50, 500 lbs. \$6, 1,000 lbs. \$10, ton \$18. We are favorably situated in regard to carload lots and we offer Pulverized Limestone in quantities of 30 tons or more at \$9.50 per ton, f.o.b. shipping point; packed in heavy weight paper bags.

HYDRATED LIME. This Lime is especially prepared for agricultural use and is a combination of calcium-hydroxide and calcium-carbonate, very finely pulverized. Hydrated Lime is another name for slaked lime; it may be regarded as quick-lime combined with one-third its weight of water. 5 lbs. 30 cts., 10 lbs. 50 cts., 25 lbs. \$1, 100-lb. bag, \$2; 500 lbs. \$8.75, 1,000 lbs. \$16, ton \$30. Carload lots at \$18 per ton, f.o.b. shipping point.

WHICH KIND OF LIME TO USE

For both large and small areas of land that is not only acid but is generally unhealthy, productive of fungous disease, teeming with earthworms and other soil-pests, use Limag. It is quick in action, and its lasting properties may be regarded as greater than Hydrated Lime but not so marked as Pulverized Limestone.

For large areas of acid soil, such as golf-courses, estates, or farms, where frequent applications are not profitable, use Pulverized Limestone: it is slow in its action but its effects last for quite a long while. When using Lime in quantity, Pulverized Limestone is to be preferred.

For small areas of acid soil, like suburban gardens and house lawns, and in cases where applications may be made every year or oftener, use Agricultural Hydrated Lime: it is very quick in its action—you will see results in a few weeks, but it is not so lasting in its effects.

UREA The All-Nitrogen Fertilizer

An organic compound prepared in a European laboratory. It contains 46 per cent of available nitrogen—more than any other fertilizer on the market. It may be broadcast and raked into soil before sowing grass seeds at the rate of 500 lbs. per acre, or 1½ ozs. per square yard, or it may be added to compost and used as a top-dressing for existing grass—use one ounce to each square yard mixed with six times its bulk of compost. As a liquid manure dissolve one pound in a 50-gallon barrel of water. Use 8 to 10 barrels on an average putting-green. 1-lb. can 75 cts., 50 lbs. \$12, 100 lbs. \$24, 500 lbs. \$110.

A Simple Method of Testing a Soil for Lime

Soil that has not carried a crop for some years, or in which a very high proportion of vegetable matter exists, will frequently show an acid condition. Very few grass plants thrive in soil which is highly acid; most grasses succeed best in land which is only slightly so, and it is frequently necessary to correct a highly acid condition by adding lime.

We offer, on page 46, a simple device for ascertaining if soil needs lime: it tells how much lime is already in your land, and indicates exactly what further quantities are needed to grow a particular crop.

A measured sample of soil is placed in the bottle, water is poured down the graduated tube to fill a small chamber, and an acid solution, which is furnished, is poured into a receptacle. The stopper with its attachments is replaced and the bottle lightly shaken; gas is generated in the bottle and the pressure causes the water to ascend in the graduated tube to indicate the total amount of lime that you have in the top 5 inches of your soil. A table furnished with the set indicates the quantity of lime needed by the particular crop.

You add the difference—exactly, because more than the correct quantity would be wasting lime, and less would not give results.

There are a number of conditions which indicate that land needs lime; the experienced farmer looks for them at once. Among them are the following:

(a) The presence of sedges, rushes, sorrels, or wild iris shows lack of drainage, with consequent probable acidity. In this case, drainage is usually needed badly.

(b) Patches of moss indicate either acidity or poverty of soil: that is, a lack of the foods needed by grass. It is a good thing to correct for both possible causes by dressing with lime and then adding compost or manures and a chemical fertilizer.

(c) Sour land, needing lime, has a disagreeable smell that is readily recognized by greenkeepers.

(d) Land that lies low, land which has recently been cleared of trees and brush, or land that is excessively wormy—all these usually are signals that lime is advisable. All the above, too, if excessive, indicate that drainage should be considered also.

Do not add lime to putting-greens; use charcoal instead. A dressing of this sweetens the soil but has little effect, one way or another, on clover. On the other hand, clover benefits very markedly from an application of lime.

Is it Necessary to Test a Soil for Other Elements than Lime?

Of other plant-foods needed by grass, the three most important are: nitrogen, phosphoric acid, and potash. An analysis of soil will almost invariably show that these three are present in sufficient quantity to support grass. But an analysis will not tell you how much of these may be ready for the plants' immediate disposal, and how much is locked for future generations of plants to use. These elements, though widely present in soils, are generally in a state in which the plant cannot use all of them at once. The decomposition, which alone time can effect, is necessary gradually to release these elements for the use of plants. As, therefore, a chemical analysis does not tell you fully what small proportion of the elements in question are immediately available, and as, if it did, such proportion would be very small, it is generally desirable to proceed along the following rules.

In sowing down a new course, if the land has previously carried good crops, it will generally not be economy to add further quantities of nitrogen or phosphoric acid, but if it has lain waste for some years, it is always desirable to add a chemical fertilizer containing both nitrogen and phosphoric acid. In existing turf, in view of the fact that the grass is being cut, which is another way of saying the grass is being cropped regularly every day or two during the summer, it is always a good rule to return to the land approximately as much phosphoric acid and nitrogen as the grass clippings may be expected to have removed together with the quantity of these elements that may have seeped away in the drainage water. In other words, in sowing down new land, the addition of these two elements is generally desirable, and in the treatment of existing turf, their addition is almost always desirable. It is fortunate that grass plants need very little potash, and there is generally sufficient in the soil to take care of their requirements; it is usually unnecessary to add it except to protect against fungous disease.

After nitrogen and lime, phosphoric acid is the element that is most frequently lacking in soils, and is the one most needed by young grass. An economical and desirable fertilizer would have an analysis of 2-10-1, which would mean: 2 per cent ammonia—nearly 2 per cent nitrogen—10 per cent phosphoric acid and 1 per cent potash. It will be understood that in the case of newly sown fairways an additional quantity of nitrogen will have been added by the cover-crop or manure. We offer a material that we consider an ideal dressing for fairways in our "Fairgreen Fertilizer," and the cost, approximating only about \$35 per acre, is such as to warrant its being used in quantity.



At the Blind Brook Club, Port Chester, N. Y. Opened for play the latter part of July, 1917—one year from date of seeding. Grass seed for the original construction supplied by Stump & Walter Co.

The Compost Heap



Levick

The Third Green at Canoebrook Country Club, Summit, N. J., where the Metropolitan Open Championship was held two years ago. Grass seed for this course supplied by the Stump & Walter Co.

Good turf is the result of constant, unremitting care as much as of initial selection of soil and seed. In other words, turf has to be "nursed" along all the time, and the most effective way to care for it is to scatter broadcast materials which feed or protect the grass. These materials consist essentially of two ingredients:

1. A plant-food, yielding some one or another of the elements required by grass, chief being ammonia, phosphoric acid, potash and lime, mixed carefully with:

2. A "filler" or base which serves the primary purpose of distributing evenly the above-mentioned food and which secondarily may be of value by adding further quantities of plant-food, and, what is more important, may be used to improve the mechanical condition of the land.

Such a mixture we call "compost." Land to grow grass must not be too light or too heavy, too porous or too sticky; must not contain too much vegetable matter, nor must it contain too little. It should, in short, be as near as possible to a medium sandy loam, and, in deciding on a "filler" or base, that one should be chosen which will have a tendency to correct and bring to the happy desired mean the soil of the greens.

All grass will benefit with an application of compost, but especially turf which is thin and poor or coarse, and which covers soil which is (1) excessively light, (2) excessively heavy, or (3) which contains an excess of decayed vegetable matter. Grass does not like an over-abundance of any one ingredient in the soil, and, by means of top-dressings, it is possible eventually to correct such a condition so far as the uppermost layer of the soil is concerned.

As to when top-dressings should be given, we advise a comparatively heavy dressing of compost before winter, say 3 or more cubic yards per green; a medium-heavy dressing, say 1 or 2 cubic yards per green in early spring; and a very light dressing, say 5 to 10 wheelbarrow loads per green, every three or four weeks during the playing season. This latter quantity is so small that play is not interfered with.

What is an ideal compost for top-dressing depends upon the soil upon which the greens are built. For land that is

light (1), we advise a mixture of good top-soil, mushroom soil, and Emerald Grass Fertilizer.

For land that is medium or heavy (2), we recommend a mixture of coarse sharp sand, mushroom soil, and Emerald Grass Fertilizer.

In constructing the storage-pile, mushroom soil should be spread in a layer 4 inches thick, the top-soil or sand 3 inches thick spread over it. Continue with alternate layers of mushroom soil (4 inches) and top-soil or sand (3 inches) until the pile reaches a height of 4 or 5 feet. On the top of each layer of soil add a little Emerald Grass Fertilizer, and for heavy land on each layer of mushroom soil dust a very small quantity of Limag. (See page 28.)

For land that has an over-abundance of vegetable matter in its composition (3), use sand only, or a mixture of sand and top-soil, with Emerald Grass Fertilizer. Care has to be taken in selecting your top-soil, because it frequently contains many weed seeds.

A compost heap cannot be too large. Although a top-dressing may with every advantage be given immediately the heap is made, the longer the compost is kept, the more valuable it will be. Sufficient to last several years is not too much. An average eighteen-hole course will consume a minimum of 100 tons (3 carloads) of mushroom soil, and 60 cubic yards of coarse, sharp sand every year for top-dressing and other work. It is a good plan to make one's heap long and narrow, say 10 feet wide, 6 feet high, and as long as necessary.

This heap of layers of sand or top-soil, and manurial matter should preferably be in a pyramid shape, as this will shed rain, but it is far better for the club to realize that every rainstorm is robbing their manure of some of its value and to *provide a roof* over the compost heap so that the fertilizing materials will be conserved.

There is no special apparatus required for applying top-dressing. It is readily broadcasted by means of shovels or by hand, and where, by accident, a little may have been deposited somewhat too thickly, it may be evenly distributed with the aid of birch brooms or rakes. When taking compost from the heap, use care to spade through in a vertical manner, thus obtaining a complete mixture, and *pass the material through a rotary screen before applying*. When the compost heap has been newly made, the largest mesh of this screen will generally be of ½-inch mesh, but as the heap gets older and decay becomes more complete, a screen with a ¼-inch mesh as the maximum may be used. All material which refuses to pass through the screens may be returned to the compost heap to decay further.

There are other uses to which we may put compost. In any construction work, particularly new greens or tees, a layer of compost is invaluable to form a seed-bed. In sodding, the soil on to which the sods are to be laid can well be mixed with a little compost to ensure their "taking," and, after laying, they may be cemented together by sprinkling over them, and between the cracks, some of the above-mentioned compost, to which a few pounds of suitable grass seeds have been added.

Compost HOW FAR WILL IT SPREAD?

Thickness of layer	Quantity deposited				Area that 1 cubic yard will cover
	Per square yard	Per 400 square yds. (Small putting-green)	Per 500 square yds. (Average putting-green)	Per 600 square yds. (Large putting-green)	
Inches	Cubic yds.	Cubic yds.	Cub. c yds.	Cubic yds.	Square yds.
.1	.0028	1.12	1.40	1.68	360
.2	.0056	2.24	2.80	3.36	180
.3	.0084	3.36	4.20	5.04	120
.4	.0112	4.48	5.60	6.72	90
.5	.0140	5.60	7.00	8.40	72
.6	.0168	6.72	8.40	10.09	60
.7	.0196	7.84	9.80	11.76	52
.8	.0224	8.96	11.20	13.44	45
.9	.0252	10.08	12.60	15.12	40
1.0	.0280	11.20	14.00	16.80	36
2.0	.0560	22.40	28.00	33.60	18
3.0	.0840	33.60	42.00	50.40	12
4.0	.1120	44.80	56.00	67.20	9
5.0	.1400	56.00	70.00	84.00	7.2

What Does Soil Weigh?

The terms "heavy" and "light" when applied to soils refer to the kind of labor necessary to work them and they have no reference to the actual weight of the material. A glance at the following table shows that a cubic yard of "heavy" soil actually weighs less than a similar quantity of "light" soil.

Weight of Soil Materials

	Cubic foot Lbs.	Cubic yard Lbs.
Humus (as naturally found).....	20.9	564
Humus (prepared).....	35.0	945
Water.....	62.3	1683
Clay.....	63.0	1701
Medium top-soil.....	71.3	1925
"Heavy" (i. e. sticky top-soil).....	89.4	2414
Quartz (sand).....	90.3	2438
"Light" (i. e. sandy) top-soil.....	96.6	2608
"Heavy" (i. e. sticky) subsoil.....	101.4	2738
Medium subsoil.....	102.3	2762
"Light" (i. e. sandy) subsoil.....	106.9	2886

Cover the Manure Heap

Manure will deteriorate in value unless it is protected by a roof. Every rain will wash away its most valuable chemical constituents, and it is far best kept in a shed or similar building. If this is not possible, and the open is the only place for the heap, then at least construct it with sloping sides so as to shed rain, and cover with a 4- or 6-inch layer of soil.

A further advantage in placing the manure or compost heap under cover is that during bad weather work need not stop. On large estates, golf-courses, etc., there is a steady demand for screened manure or compost, and the screening, under cover, is an excellent rainy-day job.

Mixing Fertilizers

It is usually quite unnecessary for the Greenkeeper to mix his own fertilizers, for the Stumpp & Walter Co.'s line of already mixed fertilizers will be found sufficient for most requirements. They are blended in accordance with well-tested formulas. However, for those who prefer to mix their own, the following two points will be of assistance:

First. Some fertilizers should never be mixed together or applied at the same time. Never blend:

Calcium cyanamid with sulphate of ammonia, acid phosphate, or animal manures.

Sulphate of ammonia with basic slag, calcium cyanamid or lime.

Lime with bone-meal, tankage, blood, acid phosphate, basic slag, sulphate of ammonia, or animal manures.

Acid phosphate with basic slag, calcium cyanamid, or lime.

Basic slag with animal manures, acid phosphate, sulphate of ammonia or lime.

Other fertilizers may be mixed with safety.

Second. Make your blends immediately before you use them. There are many substances among the list of fertilizers which will very quickly deteriorate if kept any length of time after mixing together.

When applying fertilizers to grass, a quantity of top-soil, sand, or humus may well be used as a filler or distributor when applied to a small area in the proportion of two parts by bulk of compost, sand, or humus to one part of the fertilizers to be applied. (It is generally not practical to use a base when fertilizing large areas—fairways for example.)

The use of a filler ensures an even distribution of the active material, avoids any burning of the grass, protects the plants, and may be employed to improve the mechanical condition of the land. For example, greens on heavy land will be greatly improved by the continued use of sand with every top-dressing; the advantages are obvious of employing humus to aid in the distribution of fertilizers to light, hungry soils.

We are prepared to advise personally with you on your turf difficulties, a service which has been a characteristic of our business for the past ten years.

Sheep on a Golf-Course

On light land, the presence of sheep is generally very advantageous. They keep the fairways well cropped, and, generally, in their feeding they are very thorough. The effect of their treading in firming and compacting light land is very valuable, and their manure is rich in plant foods. They will generally not do much damage to putting-greens, because the grass on the green is always kept so well cut that there is little temptation to cause them to leave the longer grass of the fairway. On medium or heavy land, or on any soil during wet weather, sheep should be rigorously excluded. Goats may sometimes be used to crop bunkers.



One of the principal features of our business is to keep always a display of seasonable goods at our spacious stores, and we invite our patrons who come to New York to visit us. You will find our people always ready to talk with you about your turf problems.

Materials for the Compost Pile

MUSHROOM SOIL, in cars containing from 30 to 40 tons, \$5 per ton, f.o.b. Pennsylvania shipping point. Mushroom Soil is partly decayed horse-manure, which has grown a crop of mushrooms. Only pure droppings from healthy animals will produce mushrooms; hence Mushroom Soil is a particularly desirable type of manure. It is highly concentrated, and in comparing its cost with that of fresh stable manure, it may be assumed that one ton of Mushroom Soil is equal in value to at least two tons of fresh manure.

HUMUS, in cars containing from 30 to 40 tons, \$10 per ton, f.o.b. New Jersey shipping point. Humus is decayed vegetable matter that has accumulated for centuries in swamps and woodlands. It is occasionally preferred by greenkeepers for top-dressing. We offer Humus that is well aerated and screened.

LIMAG. Combined lime, magnesia, and potash. An imported product of great value for manure-piles and compost heaps and for spreading over newly plowed land: evap-

oration of valuable nitrogen is prevented and moisture is conserved. When building the heap, whiten with Limag each layer as it is deposited. Clover will not be encouraged unduly with Limag. 100 lbs. \$3, 500 lbs. \$12.50, 1,000 lbs. \$22.50, 2,000 lbs. \$40. In carload lots, \$30 per ton.

PULVERIZED LIMESTONE. Wrapped in heavy-weight paper bags, in cars containing from 30 to 40 tons, \$9.50 per ton, f.o.b. New York shipping point. Special quotations for less than car quantities.

Lime is required by all crops, especially for the successful growing of grass, and, owing to its extreme fineness, Pulverized Limestone admits of very even distribution.

We do not advise the use of lime in quantity as a dressing for putting greens, owing to its stimulating effect on clover: a small amount in the compost is all that greens should receive. On fairways about one ton to the acre may be broadcast. Two tons per acre may be harrowed into plowed land on construction work. Kentucky Blue Grass and Bermuda Grass both give best results after the land has been limed.

S. & W. Co.'s Special Grass Fertilizers

S. & W. Co.'s Emerald Grass Fertilizer. For putting-greens and tees. A well-balanced formula designed to feed the finer grasses only and to keep them in best condition. It will not burn the grass if applied with average care. For preparing the soil of new greens and tees it may be used at the rate of from 100 to 150 pounds per average-sized green (less in proportion for tees), or from 4 to 5 ounces per square yard. Take care that it is mixed with the soil no deeper than 3 inches. As a top-dressing use one-half these quantities and mix with twice its bulk of compost, sand, or humus. \$5.50 per 100 lbs., \$20 for 500 lbs., \$75 for 2,000 lbs.

S. & W. Co.'s Fairgreen Fertilizer. For fairways and for large areas of turf generally. Use at the rate of from 1,000 to 1,500 pounds per acre when preparing new land. Take care that it is mixed with the soil no deeper than 3 inches. To improve existing turf, use one-half this quantity. Has a quick effect upon grass and the improvement is lasting. May be used during spring, summer, or fall. Is a desirable grass food and it will not burn if it is not used in excess of the foregoing quantities. \$3 per 100 lbs., \$13.50 for 500 lbs., \$50 for 2,000 lbs. Write us for carload prices delivered to your station.

S. & W. Co.'s Anticlover Manure. For putting-greens, tees, and fine lawns. Is a complete plant-food, but stimulates chiefly the grasses. These are encouraged to grow at the expense of clovers and other leguminous weeds. The

grass is seen to improve after the first top-dressing, and under average conditions clover will disappear after a few applications. Should be applied as a top-dressing to existing turf every spring and fall, at the rate of 50 to 75 pounds per average green, mixed with twice its bulk of compost, sand, or humus, to make certain that it is applied properly. For smaller or larger areas, allow 2 to 3 ounces per square yard. \$6 per 100 lbs., \$25 for 500 lbs., \$42.50 for 1,000 lbs., \$80 for 2,000 lbs.



On the links of the Fawn Club, Lake Placid, N. Y. Photograph of a green taken six weeks after seeding; the tee shown is claimed to be one of the highest in elevation in the country—it is 2,162 feet above sea-level. Stumpp & Walter Co.'s Seeds used.

An Appreciation We note the following in *The Sun and New York Herald* of August 8, 1920: "One of the best golf courses in the Metropolitan district is that of Hollywood at Deal, N. J., where the international professional best ball match between the American and British teams of Hagen and Barnes and Ray and Varden was played last Sunday. Here is a course, the soil and turf of which are as close to perfection as there is any need for these to come."

We note the following in *The Globe* of September 22, 1920: "Both Varden and Ray have agreed that Hollywood is the best course that they have ever seen in America, and they have played a lot of them."

NOTE.—The Hollywood course was in even more perfect shape in 1924 than in 1920; Stumpp & Walter Co.'s Seeds and Fertilizers have been used there exclusively and their advice followed, for the past nine years.

Top-Dressing Putting-Greens

We would refer our readers to an instructive article in the March 21, 1923, issue of the Bulletin of the Green Section of the U. S. Golf Association entitled "Top-Dressing" by Lyman Carrier. We quote the following in reference to trials undertaken by Dr. Carrier at Arlington: "The most heavily fertilized plots in our fertilizer experiment have the finest texture of all."

The farmer crops his land once, or perhaps twice a year, and he endeavors to return to the land in manure and chemical fertilizers approximately the same or a rather larger quantity of nitrogen, phosphoric acid, potash, and lime than his crops have taken from the land. The greenkeeper is cropping his greens every one or two days, and in a similar manner should return to the soil that which is taken from it. It is true that grass clippings may be left on the turf to decay and return their elements to the soil, but this is a very slow process, and in the meanwhile the grass suffers in texture and quality if the clippings are allowed to remain; further, the continued scattering of grass leaves, which dry into hay, gives the turf a light color, and the whole green is displeasing to the eye.

To return to our farmer: he is growing crops which root anything from 10 to 24 inches into the soil. With turf we have a crop which roots 4 inches only: this means that for success the top 4 inches must be of the highest quality that can be procured, and it also means that the wastage of plant-foods carried down into the soil by rain and drainage-water is many times greater than the loss suffered by the farmer. Hence it has been found in practice that it is very necessary to top-dress the greenkeeper's growing crop, just as certainly and far more frequently than the farmer manures his. The best method to pursue is to arrange for top-dressings so frequently that they can be very light in quantity—so light, in fact that after being applied they are practically invisible after the first watering.

Top-dressings should consist primarily of a base of such material that will:

1. Correct any mechanical defects in the soil. Sand, for example, is good for sticky soils, Top-Soil for light soils, Mushroom Soil or Humus for land deficient in vegetable matter.
2. All other things being equal, it is best to use a material which at the same time affords some food for the grass. Mushroom Soil, or Cotton Seed Meal would come under this head.
3. Be free of weed seeds. Top-Soil is invariably full of weed seeds of one kind or another, and should be used only after samples of it have been spread on a flat surface for a few weeks to ascertain what and how many weeds develop directly from it.

Following is a list of suitable top-dressing bases:

Compost. (A specially compounded mixture that should be available on every course. See page 26.)

- | | |
|-----------------------|------------------------------|
| Sand | Charcoal |
| *Humus | Screened Peat-Moss |
| *Mushroom Soil | *Top-Soil |
| *Rotted Stable Manure | *Certain factory by-products |

Materials marked * should only be used after thorough test to ascertain their freedom from weed seeds and—very important in the case of strange substances—that they are harmless to plant-life. To the base, selected with a view to the soil requirements, will be added such other materials as the condition of the turf seems to indicate. In other words, the base serves as a carrier to distribute quickly and evenly whatever plant-foods the greenkeeper decides to use. These plant-foods have been listed (at least those more generally used) in a table elsewhere in this book, from which the greenkeeper will be able to make his selection.

It is a good plan to start a system of regular top-dressings every three weeks. If the grass is in good shape, and its condition does not really call for definite feeding, then give the top-dressing of base only: Sand, Humus or Mushroom Soil.

The application is simple: about five to ten wheelbarrow-loads of the base, mixed with the determined quantity of the plant-food, is turned several times with spades, screened and broadcast by hand over the green.

The principles of top-dressing a fairway are essentially the same, except, of course, the dressings cannot be given as often. Once a year is more than most clubs can afford, although twice a year, spring and late summer, would generally repay the club for the expense involved.

A reference to the table elsewhere in this book will give an idea as to quantities generally used, both of base materials and the more active chemicals. These quantities may be adopted so far as the fairway dressings are concerned, but they may be reduced materially when the regular dressings are given to the greens. Reduce the base materials sufficiently that play will not be interfered with and that the appearance of the turf will not suffer, and reduce the active materials to one-quarter or one-half.



The Seventh Green on the beautiful Fennimore Country Club, White Plains, N. Y. Grass Seed for this course supplied by the Stump & Walter Co.

The United States Golf Association (Green Section)

Every Club should identify itself with this official organization. Not only for the very practical and up-to-date green-keeping pointers that are given in the Bulletin which is published, but also because by so doing support is given to a movement which is calculated to improve generally turf conditions throughout the country. Particulars are obtainable by communicating with Mr. W. B. LYDENBERG, Executive Secretary, P. O. Box 313, Pennsylvania Avenue Station, Washington, D. C.

Worms in Putting-Greens THE PRO AND CON

Worms allow air to penetrate further and more freely than it will in soil that does not contain worms. They drain the land. They add to the fertility of the soil by taking into their systems portions of the subsoil, and, by a process akin to digestion, modify it; this modified soil is ejected in the form of casts, and the soil of worm-casts is very fertile. Further, an excess of earthworms is but a symptom of defective drainage, excess moisture, too much organic matter, soil acidity, or an overdose of animal manures.

Worms are disagreeable in appearance and to many people nauseating; their casts invariably contain weed seeds brought up from the depths below and placed amid conditions favorable to growth. Worm-casts make putting impossible. They may be removed by brushing, but the brushing has to be done immediately the casts are formed, otherwise the grass is smothered and killed in patches; this means brushing daily at least, and such brushing, though beneficial when done in moderation, is a very serious cause of damage when done continuously. Any casts that are made between brushings are either rolled flat or trodden flat by the players, in both cases making a bare patch from 2 to 3 inches in diameter which does not heal under ten days. A wormy green is unplayable in spring or fall or during wet weather.

Above, in short, is the "pro" and "con" of earthworms.



The rough on this course yields a good hay crop annually. This is one of a number of stacks constructed every year at Essex County Country Club, West Orange, N. J., where Stump & Walter Co.'s seeds are used exclusively.

If you decide to get rid of earthworms, there are several ways by which you may do so.

You may use "Vermol," an imported preparation. "Vermol" is a dry powder, non-poisonous, and has long been considered the best in its class. It is easy to apply, safe, and very efficient. We believe the reason for its high efficiency lies in the fact that it does not entirely dissolve in the water used for washing it into the turf, but remains partly in suspension. With the powder in suspension it is easily seen that the more water is used the farther down into the soil the material is carried; so, practically speaking, there is no limit to the quantity of water you may use with "Vermol." Half a pound of "Vermol" per square yard, well watered into the turf, is the allowance.

We also offer the untreated Mowrah Meal, said to be the base of the various non-poisonous, dry-powder preparations.

The most effective liquid worm eradicator is Reade's Electric, described below.

We offer, too, Bichloride of Mercury; take 10 pounds of it, 3 pounds of Ammonium Chloride, and dissolve in 50 gallons of water. Mix $\frac{1}{2}$ gallon of this stock solution with 50 gallons of water; 20 to 25 barrels of the dilution may be applied to the average green.

Vermol Worm Eradicator. (Powder.) The best of the non-poisonous class of worm-killing preparations, absolutely effective, harmless to man and animals, and will not injure the turf. Price, ton \$95, $\frac{1}{2}$ ton, \$50, $\frac{1}{4}$ ton \$27.50, f.o.b. New York, Chicago, Pittsburgh, Detroit, and San Francisco. Used at the rate of $\frac{1}{2}$ pound per square yard, 250 pounds per average putting-green.

Mowrah Meal. The basic material of many dry powder earthworm eradicators. We offer on a "run of stock" basis, with no guarantee as to effectiveness or harmlessness to turf. Ton \$55.

Reade's Electric Worm Eradicator. (Liquid.) A liquid, one gallon of which is diluted with from 200 to 250 parts of water, and the turf thoroughly drenched with the diluted liquid. Four gallons of concentrated material is the average allowance per putting-green. 5 gals. \$17.50, 10 gals. \$34, 50 gals. \$150.

New Sprinkling Cart, Reade's, consisting of a 50-gallon barrel, mounted on wheels and with a 6-foot sprinkling boom, complete with glass measure and storage bottles, \$50.

Bichloride of Mercury (Corrosive sublimate). A deadly poisonous powder. Lb. \$2.

Ammonium Chloride. A solvent for Bichloride of Mercury. Lb. 25 cts.

Fungous Diseases—Brown-Patch

The sudden appearance of patches of dead grass immediately puts the greenkeeper on his guard for fungous disease. Sometimes these patches are due to the washing away of the fertility in the soil, to the scaldings of dogs, to the burning effect of hot sun on dewladen or cobwebbed grass, to beetle and grub attacks, or to some other mechanical cause. Frequently, however, they are due to fungus. We advise the following if an attack of these bare patches is expected, no matter whether the cause be mechanical, bacterial, or fungoid in origin:

- (1) Dressings of 25 pounds of Scotch Soot, 10 pounds of Powdered Sulphur and 10 pounds of Tobacco Dust per average putting-green be given every two weeks mixed with compost.
- (2) No top-dressings be given at any time in which mushroom soil, humus, or manure exceeds 25 per cent of the composition.
- (3) Fertilizer dressings containing blood, tankage, or other material of an insect-attracting nature be withheld.

(4) A dressing of charcoal and sand be occasionally given through the year to such greens as are of a heavy or sticky nature.

(5) Once greens are affected poling and rolling be discontinued, and that they be not used or walked upon when wet.

(6) Immediately greens become affected in the least measure, the spots be soaked with a solution of Semesan, using 1 pound with 50 gallons of water. Use it at the rate of 5 quarts to the square yard.

(7) On the first sign, spray the greens twice a week at least, oftener is better, with the Semesan solution. You may dust on the Semesan if preferred, using 1 pound of the powder per 1,000 square feet.

(8) Use catchers on all lawn mowers.

A deficiency of potassium in the soil is conducive to attacks of fungus. Keep the grass growing steadily by regular monthly dressings of compost containing Emerald Grass Fertilizer which contains a high proportion of potash.

White Grubs

During late summer the work of the *small* white grub becomes apparent on many areas of turf land. Patches of dead grass appear, and these patches it will be found, may be lifted and rolled back like a rug. The *small* white grubs which have done this damage by eating off the roots of the grass plants will be found in their hundreds as the turf is raised.

Cyanide Treatment

A recent bulletin of the U. S. Golf Association recommends that Cyanide of Soda be applied to the turf in solution. Great care must be exercised however, as Cyanide of Soda is one of the deadliest poisons known to man.

In experiments which have been made it has been found that when a solution of 10 ounces to 50 gallons of water was applied to an area of 200 square feet, a 96 per cent extermination of the grubs was effected. This strength of solution turned the grass yellow, but it fully recovered in from three to four weeks.

Eight ounces to 50 gallons of water produced an 80 per cent kill, and turned the grass yellow in spots but did not produce any permanent injury.

A six-ounce solution produced a 50 per cent kill and did not affect the grass at all.

The saturation of the turf should be done early—late in August or early in September—and the turf should be heavily rolled after treating. The treatment also killed angleworms.

While the grass seemed to be burned immediately after treatment, a month later it was of a deeper and richer color and more vigorous than the grass in untreated portions, showing that the Cyanide, in its secondary effect, has some fertilizing qualities.

Great care must be used in handling Sodium Cyanide, as it is a deadly poison; it eats away all brass and copper fittings.

The proper quantity to use is 50 gallons of solution to 200 square feet of area. This means wetting the turf almost to the point of saturation, and we recommend for the proper distribution of this solution S. & W. Co.'s Water Barrel Truck with a 50-gallon barrel and sprinkler attachment; the cost is \$35, and it is ideal for small areas. For larger areas we recom-



Small White Grubs discovered upon raising the turf. Note the damage done—the sod can be lifted up like a carpet

mend a Watering Cart—one carrying 175 gallons and needing one horse, costing \$200; 450 gallons, for two horses, \$595; 600 gallons, also for two horses, \$650.

Bisulfide Emulsion Method

The N. J. Experiment Station gives us the following method. Dr. T. J. Headlee says it was worked out by Mr. B. R. Leach for use against the grub of the Japanese Beetle, whose habits are similar to those of the Small White Grub. We have found the method effective, simple and safe.

(a) Take a 2½-gallon cauldron; put 2½ gallons of water in it, together with 2½ pounds of Whale Oil Soap. Stir, and boil until thoroughly dissolved. Allow to cool. This forms the "Stock Soap Solution," a supply of which should be always on hand, and while the turf is being treated it will be necessary to prepare it continuously.

(b) Put in an Ice Cream Freezer—

15 pounds Carbon Bisulfide
3 pints Stock Soap Solution (cold)

With the cover on the machine, work the Freezer until the mixture becomes about the consistency of ice cream. This should be done out-of-doors, and the operator should not smoke. At first the machine will work easily, but after a while, when the mixture thickens, it will work stiffly. This thick, creamy substance we will call the "Bisulfide Emulsion." It will be necessary always to keep a supply of this in preparation.

(c) Place 1½ pints of Bisulfide Emulsion in a water-can, the size of which is not material; fill the can with water to the brim and stir thoroughly.

(d) Apply the contents of the water-can to an area of 100 square feet.

(e) While it is being sprinkled, commence washing the emulsion into the turf, using a hose. Let the water run for as long a period as it has been found by previous experiment necessary to fill a 50-gallon barrel. The idea is to apply to each 100 square feet 1½ pints of the Bisulfide Emulsion and 50 gallons of water. If the water does not readily sink into the soil, but washes off unduly, turn it off awhile and apply again, but count only the time during which the water is actually being applied.

The above directions are for areas within reach of a water-supply. For small areas away from a supply a 50-gallon barrel and truck may be filled with water and 1½ pints of the Emulsion. (We offer an outfit of this kind for \$35.)

For large areas away from water it is necessary to use a road watering-cart. For one of the 600-gallon type, fill partly with water, add 18 pints of the Emulsion, stir with a wooden paddle, fill with water, again stir and apply. 600 gallons should be applied to an area of 1,500 square feet.



The Large White Grub, which is referred to on the next page, and the Small White Grub described above

Crushing the Grubs

The grubs are soft-bodied animals, and in warm weather are found close up under the surface. Heavy rolling is therefore recommended as likely to destroy many of them.

After any of the above treatments the usual method of renovating the turf should be undertaken.

We want to emphasize most strongly that these treatments are not practical unless they are done early; before the grubs have had time to eat off a large portion of the grass roots. At the first sign of brown patches and dying grass, late in August or early in September, lift the grass with the hands, and if the turf is loose and comes away from the soil get busy. Spring is also a good time to work. The grubs are to be found then under the surface, but the damage they do is not apparent as it is in the fall.



Bisulfide Emulsion Treatment for the Small White Grub. Upper left: Preparing the "Stock Soap Solution." Upper right: Mixing the Bisulfide of Carbon and Stock Soap Solution to make the "Bisulfide Emulsion." Lower: Applying 1½ pints of the Bisulfide Emulsion and 50 gallons of water to each 100 square feet. In this case boards have been used to hold the water and to mark clearly the areas treated.

Large White Grub

This is a pest much in evidence in the South, but not noted by us further north than Long Island. It is derived from the large green June beetle. It does not eat off the roots of grass, but it burrows into the turf, throwing up a heap of soil similar to a worm-cast, but several times larger. To eradicate it insert a Stumpp & Walter Co.'s Funnel and Skewer 4 inches deep and near to the hole, withdraw the skewer portion and pour in a small tablespoonful of Bisulfide of Carbon.

Craw- or Crayfish

In the South these animals cause trouble in low-lying areas, making a hole in the turf large enough to swallow a golf-ball. The funnel and skewer treatment with Bisulfide or Carbon advised in preceding paragraph is satisfactory, using 2 tablespoonfuls of the fluid.

Ants

These troublesome pests may be generally got rid of as follows:

1. Purchase a supply of Bisulfide of Carbon, and a Stumpp & Walter Co.'s funnel and skewer.
2. Insert the apparatus 4 inches deep in or near to each ant-hill, and
3. Inject into each hole about a teaspoonful of the Bisulfide, taking care that none is spilled onto the surrounding grass.
4. Close the hole by pressing on it with the shoe.
5. Spread wet burlap over the treated areas: remove in an hour.

Select a day for the job when there is no wind blowing. Bisulfide of Carbon will kill the grass if any is spilled upon it.

A well-known greenkeeper in the metropolitan district draws our attention to the ease with which ants may be eradicated from greens by means of a lawn-sweeper, as described on page 54. After collecting the ants in the box of the sweeper it is essential that they be killed quickly—a good way is to dump the contents of the box onto a fire. Select a time for the brushing when the ants are working, and by repeating the treatment for a few mornings ants will cease to be a trouble.

Moles

Many courses are troubled with this annoying little animal. The best plan to get rid of him is to use a number of mole-traps of an up-to-date pattern, and place them in position immediately over the end of the mole's run at the spot where he is known to be working. There is one point to bear in mind in regard to the mole, and that is he possesses an extraordinarily keen sense of smell, so much so that he can immediately detect the fact that the human hand has touched the trap that has been set for him; so, in using mole-traps, it is always advisable to let them remain exposed to the air for a few days before setting, and to always work with them with the hands gloved. It is of further advantage if the gloves be buried for a day or two in soil before using.

We have had good reports regarding "Mo-Lo," a recently introduced mole poison, and we list this preparation on page 46.

There are several methods of exterminating moles by means of poison, and in cases where the ordinary means do not suffice to keep them under control, we will gladly give details of schemes, which we have and which we know to be effective, to any greenkeeper or other person interested.

An esteemed client writes us from Ausable Forks, N. Y., telling us of the good results he has had by connecting the exhaust of a power mower or automobile with a hose and putting the other end in one of the mole runs. Starting the engine on a rich mixture caused smoke to come up all over his lawn; ten minutes' running seems to have accounted for all the moles in the area reached by the lethal fumes of the gasolene engine.

Grasshoppers—Cut-Worms

Spread the following on your rough, fairways, and approaches; the quantity is sufficient to treat from 3 to 5 acres:

1. Mix 25 pounds of Bran with 1 pound of Paris Green.
2. Chop finely six oranges or lemons and add to the mixture.
3. Mix 2 quarts low-grade molasses with 2 gallons water, pour this over the poison and stir.

Mole Crickets

These burrowing crickets, which cause trouble on courses in the South, may frequently be kept in control by the following methods:

1. Dust over the turf a mixture consisting of 1 pound Paris Green and 30 pounds of ordinary low-grade flour. Keep dogs, sheep, cattle, etc., off the treated areas; or—
2. Employ the Whale-Oil Soap-Carbon Bisulphide Emulsion exactly as recommended for the white grub on page 31 of Golf Turf.

Field Mice

We understand the following is effective. Dissolve 2 ounces of Arsenate of Soda in 1 quart of water; pour it onto sufficient bran, stirring the while, to moisten it. Add some sugar. Spread where the mice congregate. We offer Arsenate of Soda at \$1 per lb.

Encourage the Birds

We note the following in the Bulletin of the Green Section, U. S. Golf Association: "*Bird Boxes in the trees. Fine idea; every club should have the spirit of the Audubon Society and encourage the birds.*" It is said that if all birds were suddenly to perish there would not be a leaf, a blade of grass, or any green thing left upon the earth within a few years—it would be uninhabitable.



Rustic Log Cabin Bird-House for one family

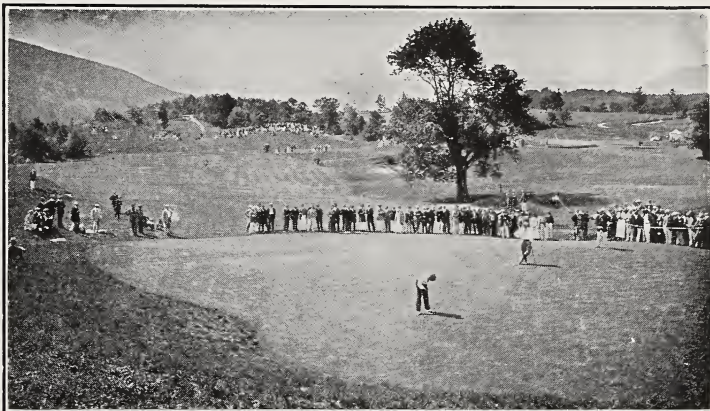
Inasmuch as the majority of birds have a keen appetite for grasshoppers, grubs, beetles, flies, and other pests, their presence on a golf course should indeed be welcome. It is recommended that pieces of suet be attached to trees during the winter months and that bird-houses be erected here and there in the trees and on fences. To encourage these delightful little neighbors, we offer bird-houses as follows:

	Each	Doz.
Rustic Log-Cabin, for one family.....	\$2 00	\$20 00
Rustic Log-Cabin, for two families.....	3 00	30 00
Rustic Log-Cabin, Colonial style, for two families.....	4 50	45 00
Rustic Log-Cabin, for four families.....	5 50	55 00
Wren Houses, Virginia pine.....	50	5 50

SPECIAL OFFER—One dozen assorted Bird-Houses, all shapes and sizes. Regular value, \$30. Special price on the collection, \$27.50.

Vegetables and Flowers for the Club House

We suggest that you grow your own Vegetables and Flowers. Together with good land, well handled, *the best possible seeds are essential.* We list these in our illustrated catalogue, a copy of which will be gladly sent on request.



The Seventh Green on the beautiful Ekwanok Golf Course at Manchester, Vt. Grass seed supplied by Stumpp & Walter Co. for twelve successive seasons

Experimental Collection of Fertilizers

Collection consists of a small quantity each of twenty materials. It is good practice to mark off areas in a little-used portion of the fairway and ascertain for yourself the effects of various fertilizers. Take pieces of level turf, measuring 5 by 10 yards, mark them clearly with pegs and labels, and apply one type of fertilizer on each. Make four applications, each separated by a period of at least three weeks. The following collection contains sufficient fertilizing material to treat each of the 5 x 10 squares four times.

50 lbs. S. & W. Co.'s Emerald Grass Fertilizer*	10 lbs. Urea*
50 lbs. S. & W. Co.'s Anticlover Manure*	50 lbs. Acid Phosphate
200 lbs. Prepared Golf Fibre	25 lbs. Scotch Soot*
50 lbs. Basic Slag	10 lbs. Sulphate of Ammonia*
50 lbs. Kainite*	75 lbs. Hardwood Ashes
50 lbs. Land Plaster	25 lbs. Dried Blood*
100 lbs. Hydrated Lime	50 lbs. Bone-Meal*
25 lbs. Muriate of Potash*	100 lbs. Cottonseed Meal
100 lbs. Tobacco Fertilizer	100 lbs. Shredded Cow-Manure
	100 lbs. Sheep-Manure*
	50 lbs. Tankage*

*Materials marked thus should always be mixed with twice their bulk of sand, soil, or humus before being applied to turf. Price of the above collection \$50, f.o.b. New York.



At Wolfert's Roost Country Club, Albany, N. Y. Photographed July 23, 1924, ten weeks after seeding. Stumpp & Walter Co.'s seeds used exclusively.

The Construction of Turf Tennis-Courts

By A. D. TAYLOR and G. D. COOPER

Landscape Architects, Cleveland, Ohio

Size. Lawn tennis-courts (double) require an unobstructed area 60 by 120 feet in an open, unshaded place. A full-sized championship tournament court should be 66 by 130 feet.

Orientation of the long way of a court should be north and south because most tennis is played afternoon and evening and this orientation does not compel any player to face the sun when it is low.

Selection of Site. The surface of the general area chosen should be as nearly level as possible without sacrificing surface drainage and a location should be selected, if possible, where large trees will not cast shadows across the court nor a light-colored background occur at ends or sides.

A good, porous, deep clay loam soil is the best, as it eliminates artificial drainage which has a tendency to drain away valuable moisture from the shallow grass roots. Such a soil is also natural grass land. Where this type of soil does not occur naturally it may be necessary to use a composted soil.

Subgrading. Generally the first step in the construction of a turf court is the grading. As the prime requisite for such a court is a deep bed of uniform top-soil, it is generally well worth while to strip the existing top-soil from the site of the court and bring the subgrade to a uniform surface which slopes as the finished court is intended to, or at an even steeper grade. At least 1 foot in depth of good top-soil is required for a permanent turf and 2 feet is better.

Underdrainage. Where the soil is naturally light or sandy or gravelly no underdrainage may be necessary, but on heavy soil, or where the surface drainage is poor, it should certainly be installed. No rule can be laid down which would apply to the draining of all courts since no two situations require the same

treatment. Each court should be studied as a new problem, bearing in mind that if the drainage is too good the difficulty can be overcome by watering the turf but if the drainage is insufficient the whole court may have to be reconstructed to remedy this fault. The drains should all be installed and tested before any top-soil is back filled on the court and inlets should be placed so as to dispose of the surface water by getting it into the drains as quickly as possible. If the court is bordered at either end or side by a slope which is likely to throw surface water across the court, inlets should be placed, and the surface of the ground outside the court arranged, so as to carry this water into the drains before it can run on the court.

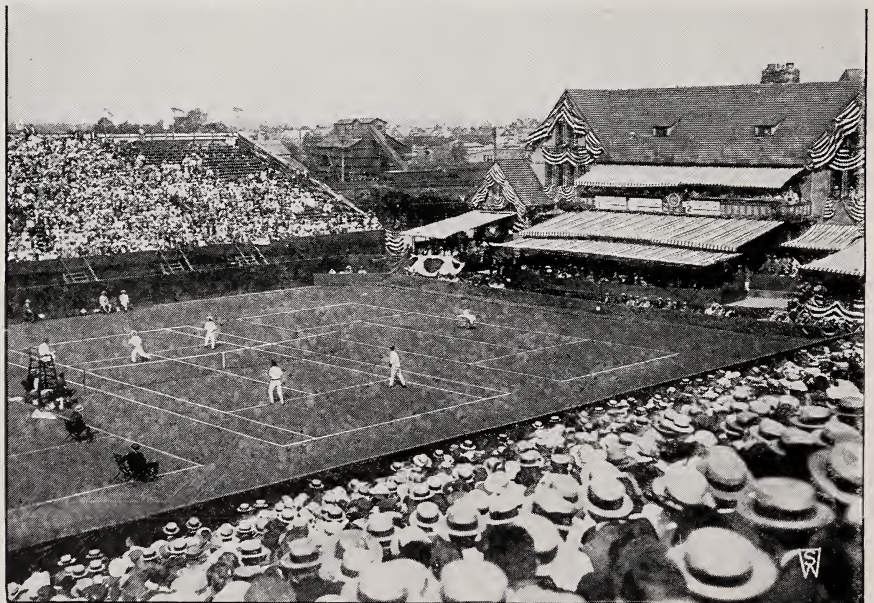
Replacement of Soil. The replacement of top-soil on the court should be done so as to secure a uniform layer of soil over the whole of the court. Too much attention cannot be given to the securing of a properly prepared seed-bed nor too much care given to the fertilizing, harrowing, weeding, and general care of the soil before seeding. As stated above, if the top-soil is not natural grass land, it may be necessary to use composted soil. This is really the ideal way to prepare a turf tennis-court as it allows the introduction of suitable plant-food in a thorough manner throughout the whole top layer of

soil and also permits modification of the character of the top soil by the addition of a portion of soil of heavier or lighter character. (For details of this method of soil preparation see the discussion of a compost heap on page 62.) When a composted soil is replaced on a court it is always well to allow for shrinkage. The amount of shrinkage to allow for when replacing composted soil varies with the degree of fineness to which the organic matter has been reduced and the age of the compost. As a rule, the older the compost is, the less shrinkage it will undergo.

It will be a good rule to allow about 30 per cent for shrinkage for coarse, young compost; 20 per cent for fine, old compost; and 15 per cent for top-soil. In other words, if the bed is filled in with coarse, young compost to a depth of 9 inches it should be finished 3 inches above the surrounding soil to allow for shrinkage.

In any event, the top-soil layer should be a good grade of loam, neither too heavy to dry out quickly after a rain, nor too light to stand hard trampling or to hold some moisture even in dry weather. It should be dark colored, uniform in texture and free from lumps, sticks, stones, trash, and rubbish of all sorts.

Fertilizing. Since a turf tennis-court, when once laid down, is intended to be a permanent feature, and also since an ideal soil for turf is so rarely found, it is always wise to fertilize the soil before sowing seed. This fertilizer should be chosen with a view to correcting the soil mechanically as well as chemically. The addition of some form of decaying vegetable matter or humus is sure to benefit any soil which is too light or too heavy, in a mechanical way, and this is in addition the most lasting form of fertilizer. If the soil has been composted this humus material will already be incorporated in it, but otherwise will have to be provided through the use of stable manure or commercial humus or



Davis Cup Doubles at Forest Hill, 1922. Grass seeds have been supplied here for a number of years by Stump & Walter Co.

The turf required for lawn tennis must be firm and yet elastic, and composed of grasses which can be mown close and which will recuperate after excessive wear. Our mixture is composed of the best-known, fine-leaved, deep-rooting grasses, properly proportioned so as to give an even playing surface throughout the year. Stump & Walter Co.'s Lawn Tennis Mixture. Qt. 50 cts., 4 qts. \$1.75, 8 qts. \$3.25, bus. \$12, 10 bus. \$115. Charges prepaid when cash accompanies order.

The Construction of Turf Tennis-Courts, continued

mushroom soil. Stable manure or mushroom soil may be applied as thickly as 1 cubic yard to each 10 square yards of ground or 80 cubic yards for a tennis-court. Such a large quantity of manure, however, if applied at one time should be thoroughly incorporated by harrowing or spading and at the same time all sticks, stones and rubbish should be removed.

After the manure has been thoroughly turned under, apply 200 pounds of Emerald Grass Fertilizer to a tennis-court and harrow the ground thoroughly so as to form a good seed-bed. This material should be used in ample season to avoid burning the grass seed, say not less than seven days before the seed is sown. The fertilizer should not be incorporated deeper into the soil than the upper 3 inches.

It is important that complete fertilization be effected before the seed is sown, as once the turf is established, any further enrichment can be effected only under disadvantages to which other crops are not subjected. Grass is a fixed crop and ordinarily derives its food from the top layer of soil and therefore this fact should always be borne in mind when fertilizing for turf.

Surface Grading. The finished surface grading of a lawn of any sort is almost always the most particular piece of work connected with the job. This is especially true when the ground is to be sown to seed as, once the seed is sown, the grade cannot well be changed. It is also an important part of the work in that the final seed-bed or germinating layer is prepared at this time. A fine, friable surface layer, sometimes called the germinating layer, is always an essential when fine grass seeds are to be sown. The court should be repeatedly raked until all stones are removed or a final layer of sifted soil should be put on. The roller should be used until it becomes apparent that there are no soft spots left. The raking and rolling will pulverize the soil and leave it in a firm condition so that the soil moisture may readily find its way up from below. This firm condition is very essential to proper germination of the seed. In case earthworms are much in evidence in the soil used to build up the court, this is the time to remove them and "Vermol" worm eradicator should be used before the seed is sown, as outlined on page 4 of cover, and preferably it should be used before much fertilizing with artificial fertilizers is done.

Unless the seed-bed is thoroughly prepared much seed will be lost, since even the coarse seed, like the fescues, should never be buried deeper than $\frac{3}{4}$ -inch and the finer seeds, such as bent grasses, probably fail to survive being buried more than $\frac{1}{4}$ -inch. Thus a great saving in seed may be effected by the preparation of a fine germinating layer.

Seeding or Sodding. The question of whether to seed or to lay sods is a perennial one. In the case of a fine piece of turf, however, such as a tennis-court should be, there is not much room for argument. Sodding cannot be recommended unless a very fine grade of turf can be secured. This turf should be of a uniform texture, color, and thickness. In other words, either a turf nursery should be available or some other source which contains sufficient turf which can be removed to the new location easily. This turf should be all of one sort of grass or a uniform mixture of suitable grasses. Needless to say such a source of supply is rare and the cutting and removing of such turf, together with the cost of relaying it, is a very expensive piece of work. The labor of relaying turf sods has in recent years cost more than three times as much as the total cost of raking, rolling, and seeding down to turf, including the cost of the seed and some fertilizer. Therefore if cost is an item to be considered, and if a very uniform turf is desirable there is ordinarily no question but that it is better to seed down a tennis-court than to sod it.

Seeding. The soil must be in a perfect condition of tilth and a screened top layer should always be provided if possible.

Seed must be sown carefully and thoroughly on a still day. If sown by hand, the sower should not be afraid to bend his back a little as the farther the seed travels, the more likely it is to fall unevenly.

The fine sorts of seeds which are used on tennis-courts should be covered lightly. That means not to exceed $\frac{1}{8}$ -inch for the bulk of the seed. Cover by a light brushing over with a "bush harrow" or by sifting a light layer of very fine soil over it. Then if a drought follows the seeding, the deeply covered seeds are likely to secure enough moisture to germinate, while if a crust forms, due to rain, the seeds covered lightly will be in an advantageous position to grow. Part of the seed should be sown while walking along a north and south line and the remainder while moving in a direction at right angles to the first so as to ensure that no spaces are left unseeded.

A light rolling should always be given immediately after the seed is sown and covered. This compacts the soil enough to bring the seed into firm contact with it and also insures the start of capillary action, thus by this means the seeds are assured of a compact, moist, germinating layer.

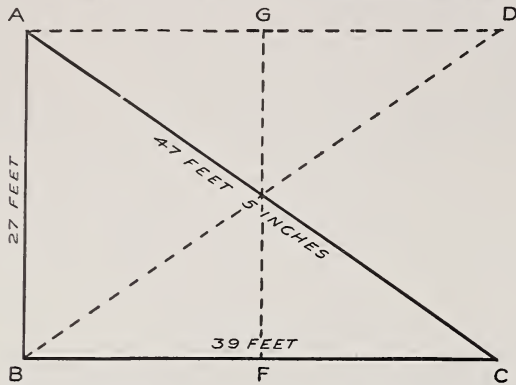
Time to Seed. Grass seeds can be successfully sown in the spring but the early autumn is the best season. In the spring all the weeds seem to be active and ready to compete with the newly sown seed for possession of the soil while by autumn few weeds are left and the grass can get ahead of the weeds. Also in the spring, unless seeding is done very early, hot weather follows quickly and before the grass plants are large enough to shade the ground, while in the autumn there generally follows several weeks of growing weather with warm days and dew at night to moisten the ground. In the spring, if the land is heavy, early working is likely to leave it sticky and impossible to sow fine grass seeds, while in autumn all land is in good condition to work as soon as the fall rains start. No dates can be definitely set for the beginning and ending of the spring or fall seeding seasons, but the months of April, May, August, and September are the best ones throughout the northern states. Very little seeding should be done before April 10 in the spring or August 15 in the fall, while June 1 and October 1 are the average closing dates.

Varieties of Grass. A turf tennis-court sown to one sort of grass would be an ideal sort to play on and for appearance but such a turf is liable to fail when most needed. No one grass is at its best at all seasons of the year and, therefore, a one-variety turf is likely to make a poor appearance and playing surface just when it is most needed. Also those grasses which are subject to disease are likely to be entirely destroyed and thus leave the court bare, whereas a mixture of grasses would not all be lost at once.

A mixture of grasses should, therefore, be selected which will provide a thick, short carpet of grass of a uniform texture so far as possible and also provide this turf at the seasons of the year when the court is likely to be most in use. Chewing's New Zealand Red Fescue is undoubtedly one of the best sorts of grass to use as it fulfills nearly all the requirements of a perfect turf plant and is at its best during the summer months when courts are most used. Of the bent grasses, the Creeping Bent or Mixed Bent and the Colonial Bent, which is nearly identical with our Native Rhode Island Bent, are undoubtedly the best. These two turf plants are at their best in early fall and thus carry the court after the Red Fescue has passed its maximum development. Red Top is another Agrostis or Bent Grass which may be used but is not so creeping in its habit. Kentucky Blue Grass may be used for its quality of reaching its maximum development in early summer, and Perennial Rye Grass for its habit of quick growth and its property of recuperating quickly after hard wear. No White Clover should ever be used as it is slippery under foot and spoils the appearance and playing quality of the turf.

How to Lay Out a Tennis-Court

(Courtesy Spalding's "How to Play Lawn Tennis")



As a double court practically includes every line to be found in a single court, it is best to take first the measure for the latter. Having determined the position of your net, plant in the ground, in the line chosen, two pegs, 27 feet apart (at the points A and B in the diagram). Then take two measures and attach their respective ends to the pegs A and B. On the first, which will measure the diagonal of the court, take a length of 47 feet 5 inches; on the other 39 feet; pull both taut in such directions that at these distances they meet in a point C. This will give

one corner of the court. At that point F, 21 feet from B, put in a peg to mark the end of the service-line. The other corner, D, and the other end of the service-line G, may be found by interchanging the measures and repeating the process. The same measurements on the other side of the net will complete the exterior boundaries of the court. By prolonging the base-line 4 feet 6 inches in each direction, and joining the four new points thus obtained, we can make the side-lines of a double court. It only remains to mark the central line. This is done by joining the middle points of the service-lines. If a double court alone be required, the interior side-lines need not be prolonged to meet the base-lines. Remember that in all cases the netposts must stand at a distance of 3 feet from the side-lines.

For a court where a single or double game can be played, the size is 78 feet in length by 36 in width. 4½ feet inside the side-lines, and parallel with them are drawn the service-lines.

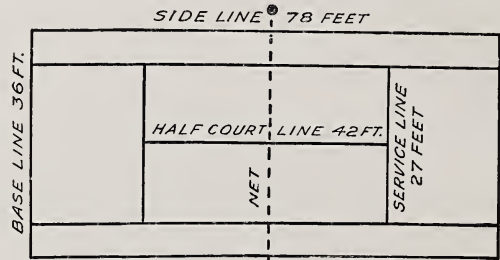


Diagram of a Single and Double Court

Clay Tennis-Courts

The building of a clay tennis-court is identical with that of building a road, and a member of the club who is a civil engineer in all probability would be available to supervise the construction of such a court. It is usual to dig out the site to a depth of 12 inches, and to level very carefully the bottom of the excavation. It is here that the engineer or surveyor will be most useful. If the services of a surveyor are not available, it is possible to level

accurately the bottom of the excavation by means of pegs driven in at intervals, and these pegs being leveled accurately by means of a spirit-level attached to a long board. Next fill the excavation to a depth of 6 inches with large broken stone, trap rock, brick rubble, or similar material. Procure a heavy roller and roll thoroughly this layer. Use a heavy pounder in those corners which cannot be reached with the roller.

On top of this 6-inch layer add one of 3 inches, and consisting of fine broken stone, coarse gravel, or coarse ashes. This layer should be rolled and also be watered very thoroughly. Let the water hose run almost continuously for several days. Check up the levels and add further quantities of this second layer where necessary. Fill in the remaining 3 inches with a mixture consisting of five parts of clay loam and one part of sharp sand. The material should be thrown onto the area by means of shovels and should be raked lightly to insure its even admixture. When the court is finally covered, levels should once more be checked up, and provision made that the center of the court is 2 inches higher than the sides, this "camber" being sufficient to shed surface water. The court should be watered and rolled twice a day for two weeks, after which it should be ready for use. For the first few months the levels should be checked up after every heavy rain.

Weeds in clay courts need give no trouble, if they are occasionally watered with Herbicide, a poisonous weed-killer.

We are prepared to advise personally with you on your turf difficulties, a service which has been a feature of our business for the past ten years.



Photo: Levick

Finals between Argentine and Meadowbrook, 1922, at the Herbert Field, Rumson Country Club, N. J. Grass Seed for both Fields at Rumson, as well as many others, supplied by the Stump & Walter Co.

For fine, uniform, hard-wearing, and quickly recuperating turf, we find that the formula of grass seeds as long used at the famous English field at Hurlingham gives the utmost satisfaction in this country. The grasses used are of the best superfine quality, of the highest purity and strongest vitality. Use 200 pounds per acre.

Hurlingham Formula. Superfine Quality. The weight per bushel is 25 pounds. Lb. 60 cts., 5 lbs. \$2.75, 25 lbs. \$12.75, 100 lbs. \$50. Charges prepaid when cash accompanies order.

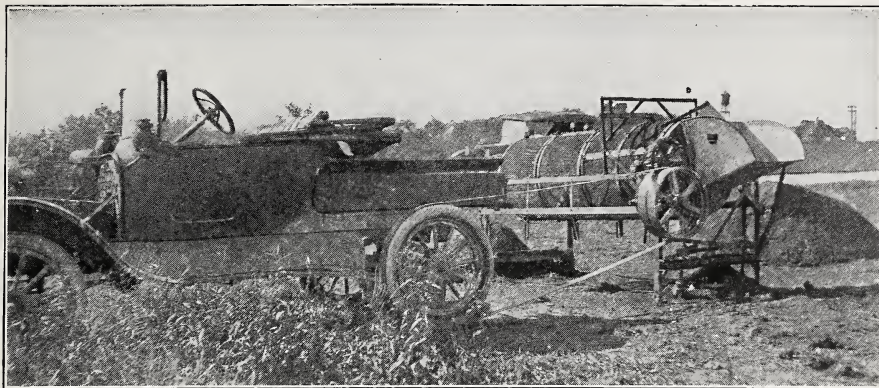


Photo reprinted from the Bulletin of the Green Section of the United States Golf Association

A Form of Power that is Readily Available

Automobile driving Rotary Soil-Screen on the Shannopin Country Club, Pittsburgh. Dr. J. L. McBride, Chairman Green Committee, writes regarding it as follows: "To our greenkeeper, Mr. Ralph C. Martin, belongs the credit for this method which has proved so highly satisfactory. . . . Your Rotary Soil-Screen has been very satisfactory, and we have used it a great deal during the past year. No eighteen-hole golf course should be without a

power-screen." The Stump & Walter Co.'s Rotary Soil Screen will be found fully described on page 42 of this book.

Miniature Golf

A putting-green in the garden is a source of practice and enjoyment that is obtained quite readily by the average golfer. At very little cost a portion of the back lawn may be top-dressed from time to time, reseeded, fertilized, and given special attention as regards rolling and cutting. Most players, however, will prefer something more worth while, and we suggest that a well planned green, properly made, with sand-traps surrounding it, if you will, would be a source of interest and pleasure to the golfer and his friends. As an additional attraction, one or more miniature tees might be arranged for, calling for a short iron shot onto the green.

Two or Three-Hole Courses

On an estate where three acres or more are available, the skillful placing of two, or perhaps three or four greens, with sufficient tees so placed that a maximum variety of shots is possible, brings a private course to the residence and affords opportunities for social golf that are unlimited. In these miniature courses there is an idea with great possibilities.



This miniature nine holes with tiny traps and bunkers, and with real water holes, occupies but little space, yet it provides real practice

What we are Prepared to do in the Matter of Miniature Golf

1. We are prepared to put you in touch with reliable golf architects whose work we are acquainted with and whose fees are reasonable. You will get an expert layout and every possible advantage of the conditions will be taken.
2. We will confer with you on the ground and give you full written directions as to how to treat your land, the fertilizers to apply, and the seeds or stolons to use.
3. We will supply, at competitive prices, the necessary materials in the best possible quality.
4. If you wish, we will furnish, on a weekly salary basis, the services of an expert foreman to work in accordance with the architect's plans and prepare the land and sow the seed in an efficient manner.

After-Care. It must be remembered that the perfect velvet-like turf of an average golf course is the result of constant care and attention, and good results on the miniature greens imply similar intensive after-treatment. Cutting with a high-grade mower at least every two days, poling, light-rolling every week, and top-dressing every month.

Watering must be taken care of when necessary, and earthworms, if present, must be eradicated.



The Greenbrier Golf Club, White Sulphur Springs, West Virginia, where the U. S. G. A. Women's National Championship was held in 1922. Grass seed for this course, as well as for the new 18-hole course opened for play 1924, supplied by Stump & Walter Co.

Proper Equipment for an Eighteen-Hole Golf Course

Check Your Implements Against This List

Following is a detailed list of implements and tools which may be considered necessary for the maintenance of a modern course. To assist in the compilation of a green committee's budget, we give the cost price of each article, but a full description of most of them, with the prices, will be found at the end of the book.

Traction and Transportation

1 Tractor	Each
Worthington Tractor.....	\$550 00
Worthington Tractor and 3-unit Mower.....	950 00
Worthington Tractor and 5-unit Mower.....	1225 00
Toro Construction Tractor.....	850 00
Toro Tractor and 3-unit Mower.....	1295 00
Toro Tractor and 5-unit Mower.....	1575 00
1 Dump Cart	
For one horse.....	95 00
Toro or Worthington Dump Wagon for tractor use....	125 00
1 Farm Wagon	
For two horses.....	198 00
3 Wheelbarrows	
Landscape Garden type.....	8 00
Contractor's type, Canal.....	5 00

Soil-Working Implements

1 Plow	
For one horse, 5½-inch furrow.....	16 00
For two horses or tractor, 7½-inch furrow.....	21 50
1 Disc Harrow	
Adjustable 10 discs.....	60 00
1 Spike-Tooth Harrow	
For one horse, spreading 5 feet.....	14 00
For two horses, spreading 10 feet.....	29 00
1 Smoothing Harrow	
Meeker or Steel Disc, 6 by 6½ feet.....	40 00
Scotch Chain, 6 by 7½ feet.....	45 00
6 Shovels (long or short handle.)	
Square point.....	2 00
Round point.....	2 10
3 Spades	2 00
3 Spading Forks	2 00
3 Potato Hooks For raking sand traps, etc.....	1 25
6 Rakes, Steel	
12-tooth.....	1 10
14-tooth.....	1 20
16-tooth.....	1 50
6 Rakes, Wood	
24-tooth.....	1 50
2 Rakes, George Low	2 50
1 Rotary Soil-Screen	
Gearred model.....	190 00
Standard model.....	170 00

Distributing Apparatus, Seeders, Etc.

1 Wheelbarrow Seeder	
Seeder only, S. & W. Co.'s.....	17 00
Seeder, with Powder-distributing Hopper.....	27 00
1 Fifty-Gallon Sprinkling and Spraying Barrel	
On wide-tread wheels.....	60 00
1 Lime Spreader	
For horse or tractor.....	65 00
1 Fertilizer Distributor	
For hand use, American pattern.....	27 00
Top Dressing Distributor, imported.....	45 00

Rollers

9 Light Putting-Green Rollers	
Wood.....	22 50
Cast Iron.....	30 00
2 General Purpose Hand Rollers	
Water Ballast, 18 inches diameter, 24 inches long.....	20 00
24 inches diameter, 32 inches long.....	26 00
Cast Iron, 20 inches diameter, 30 inches long.....	33 50
24 inches diameter, 20 inches long.....	39 50
28 inches diameter, 24 inches long.....	48 00
1 Large Fairway Roller	
One-horse, 20 inches diameter, 48 inches long.....	90 00
One-horse, 24 inches diameter, 60 inches long.....	133 50
Two-horse or tractor, 28 inches diameter, 60 inches long.....	151 50
Two-horse or tractor, 28 inches diameter, 72 inches long.....	175 50
Toro Three-Section Tractor Roller.....	150 00

Grass Cutters

6 Putting-Green Mowers	Each
Pennsylvania Roller, 16-inch.....	\$34 00
18-inch.....	38 00
Pennsylvania Side Wheel Golf, 17-inch.....	34 00
19-inch.....	38 00
Grass Boxes for above.....	8 00
3 Tee Mowers	
Great American, 17-inch.....	22 50
19-inch.....	25 00
Pennsylvania Junior, 17-inch.....	30 50
19-inch.....	34 50
3 Scythes, Complete	
English, 30-inch.....	5 00
34-inch.....	5 50
1 Fairway Mower (tractor use.)	
Worthington, 3 units.....	400 00
5 units.....	675 00
Toro 3 units.....	420 00
5 units.....	675 00
1 Horse Fairway Mower	
Townsend, Triplex.....	375 00
1 Hay Mower for the Rough	
One-horse, 3½-foot cut.....	92 50
Two-horse, 5-foot cut.....	97 50
Two-horse, 6-foot cut.....	105 00

Watering Requisites

3,000 feet Rubber Hose	
Wayhead, 3-ply, ¾-inch, 50-foot lengths. 17c. per ft....	
Golf Course, 6-ply, ¾-inch, 50-foot lengths. 23c. per ft....	
6-ply, 1-inch, 50-foot lengths.....	.40c. per ft....
9 Putting-Green Sprinklers	
Rainmaker.....	25 00
Majestic, long arm.....	25 00
Red Devil Classic.....	15 00
Double Rotary.....	12 50
6 Sprinkling Cans	
6-qt.....	1 15
10-qt.....	1 60
16-qt.....	2 20

Sodding and Turf-Repairing Tools

1 Horse-Drawn Sod Cutter	50 00
2 Hand Sod Lifters	
English pattern.....	8 50
American pattern.....	2 25
2 Turf Repairers	
10-inch Hole-Cutter.....	16 00
3-inch Hole-Cutter.....	10 00

Requisites for Play

1 Hole-Cutter, 4½-inch.	
Standard.....	12 00
Bogey (imported).....	14 00
18 Hole Cups	
S. & W. Co.'s Aluminum Mudless.....	2 50
18 Flag Poles, 10-foot.	
With spike.....	2 00
With brass ferrule.....	1 50
18 Numbered Flags.	75
18 pair Tee Markers	
Wood.....	\$.1 per pair..
Composition.....	\$.1.25 per pair..
18 Tee Boxes	
S. & W.....	12 00
Wirt.....	17 50

Sundry Implements and Equipment

Hay Forks; Iron Pails; Bamboo Poles; Axe; Crowbar; Hose Nozzles, Couplers, Menders; Green Sweeper; Ball Rack; Tampers; Lawn Mower Grinder, Scythe Stones; Mole Traps; Brush Hooks; Hand Weeders; Spike Roller; Bendelow Putting-Green Cultivator; Flexible Steel Mat; Sprayer; Duster Gun; Soil Tester.

Stump & Walter Co.'s GOLF TURF

On the beautiful links of the Irem Temple Country Club, A. A. O. N. M. S., Wilkes-Barre, Pa. Stump & Walter Co.'s Seeds and Fertilizers used.



Burn off the Rough

It is a good plan to burn off the long grass of the rough in the fall of the year. Many weed seeds, especially those of crabgrass, will be destroyed, and the rough on most courses is the most fertile source for the dissemination of weeds and coarse grasses. A further advantage is the additional protection given valuable trees against accidental grass fires.

Areas Required for Various Games

GOLF. The minimum area upon which an 18-hole course may be laid out satisfactorily is about 100 acres; for a 9-hole course about 50 acres. Each of the putting-greens usually varies from one-tenth to one-quarter of an acre of the finest possible turf. Fairways should be of a drought-resisting turf of a texture which will give the ball a good stance; they are usually 50 yards wide, thus every 100 yards of fairway is approximately one acre. The first 100 yards in each fairway is frequently allowed to remain rough, and about 45 acres in all is usually occupied by the mown fairway on an 18-hole course, the remainder comprising woodland, rough, etc.

POLO. A polo field is a perfectly level piece of hard-wearing turf 300 yards in length by 200 yards in width, if it is not boarded. If it is boarded it is 300 yards long by 160 yards wide. The goals are placed 250 yards apart.

BASEBALL. The "diamond" is a square, each side of which is 90 feet. Diagonally from "home" to second base or from first to third base it measures 127 feet 3 3/8 inches. The outfield varies; it should be as long and as wide as the land can be spared, taking into consideration, too, the necessity for a good view by the fans. The turf and track at the Yankee Stadium, New York, occupies an area of 3 1/2 acres.

FOOTBALL. A football field is 330 feet between goal posts, with from 25 to 50 feet clearance behind the goals; total length recommended 400 feet. Width recommended 160 feet.

CRICKET. The "pitch" or distance between the wickets is 22 yards. The "field," which surrounds the pitch, is as large as convenient—at least 150 yards square.

LAWN HOCKEY. Length 110 yards by 50 to 60 yards wide.

ARCHERY. The archer stands from 30 to 100 yards distant from the gold or target, according to the match conditions. Sufficient additional land to insure safety is necessary, for the power of the long bow is not often realized; a keen-pointed arrow has as much penetration at 100 yards range as a rifle.

LACROSSE. Length 100 to 125 yards, by 90 to 100 yards wide.

LAWN TENNIS. The court is marked 78 feet long by 36 feet wide. If 130 by 66 feet is allowed to each court, provision is made for run-back, and the position of the nets may be changed from time to time and so equalize wear on the turf.

CROQUET. The official measurement is 35 yards long by 28 yards wide.

CLOCK GOLF. A circle 20 to 24 feet in diameter is large enough for this, the tee plates set on the circumference and a hole sunk somewhere within the ring.

TETHER BALL. A little-known game for two players which is of interest as requiring but little space. A square of turf 20 by 20 feet being all that is necessary.

Flowers for Club-House Decoration and Beautifying of the Beds and Borders

The following is an assortment of easily grown seeds and bulbs in fine, large-flowering types. These will furnish cut bloom for the dining tables and elsewhere throughout the season and will fill planting-spaces around the club-house. Cultural directions are printed on the packages.

Flower Seeds and Bulbs for Seeding and Planting Outdoors in Spring

Table Decoration Assortment

SEEDS

2 pkts. Aretotis grandis.....	\$0 30
1/4oz. Aster, Ostrich Feather, Mixed.....	75
2 pkts. Bartonia aurea.....	20
1/4oz. Calendula, Orange King.....	50
2 pkts. Calliopsis tinctoria.....	20
2 pkts. Candytuft, Empress.....	20
1/4oz. Clarkia, Double Mixed.....	40
1/4oz. Cornflower (Cyanus) blue.....	30
2 pkts. Cosmos, Mammoth Mixed.....	20
2 pkts. Dimorphotheca aurantiaca.....	20
2 pkts. Helichrysum, Fireball.....	30
2 pkts. Globe Amaranth, Mixed.....	20
2 pkts. Gypsophila elegans alba.....	20
1/4oz. Love-in-a-mist, damascena.....	30
1/2oz. Lupin, Annual Blue.....	25
2 pkts. Marigold, African, Giant Show Orange.....	50
2 pkts. Mignonette, Allen's Defiance.....	20
2 pkts. Nemesis, Mixed.....	50
2 pkts. Queen Anne's Lace Flower.....	50
2 pkts. Salpiglossis superbissima, Finest Mixed.....	20
2 pkts. Scabiosa, Tall, Double Mixed.....	20
1/4oz. Sunflower, Dwarf Double.....	35
2 ozs. Sweet Peas, Giant Mixed.....	50
1 pkt. Sweet Sultan, americana, Giant.....	15
2 pkts. Verbena, Mammoth Mixed.....	20
2 pkts. Zinnia, Giant Double Flowering, Mixed.....	50

BULBS

24 Dahlias, Mixed.....	\$7 00
200 Gladiolus, American Hybrids.....	10 00
24 Tuberoses.....	3 00
12 Lilium auratum. 9 to 11 inches in circumference.....	4 50

Total.....\$32 80

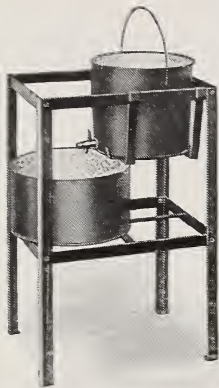
Vegetables for the Club-House Kitchen

We offer those clubs possessing vegetable-gardens, seeds of the finest quality. We will gladly advise as to proper quantities, reliable varieties, treatment of soil and cultural details generally.

The newest and most productive strains of vegetables are offered in the Stump & Walter Co.'s "Seed Annual" for 1925, a copy of which will be sent free of charge to anyone interested.

Golf and Lawn Tennis Requisites

We solicit your business for Requisites, Implements, and Machinery. We carry large stocks, and this, with our central location in New York City enables us to offer quick deliveries. While high quality is our chief consideration—because quality alone insures satisfaction—our aim also is to offer at reasonable prices.



The Stumpwall Tee Stand HAS THREE IMPORTANT POINTS

The water-pail is fitted with a spring push-button faucet. You do not tilt the pail, with possible soiling of clothes. The faucet gives you the exact amount of water required, and no more.

The water-pail and sand-container are readily removable for filling and cleaning.

Each Tee Stand is complete. It is shipped with a brush and towel attached.

The Stumpwall Tee Stand is strongly made of heavy angle-iron and galvanized ware. It is well painted in handsome green, using best quality weather-resisting paint. Complete it

Stumpwall Tee Stand

stands 32 inches high; the water-pail contains 4 gallons and the sand-container about 1 peck.

The Stumpwall Tee Stand is of novel design, highly practical, looks well, is sturdily built and it is low in price.

Stumpwall Tee Stand, complete with brush and towel, \$12 each; 9 for \$100; 18 for \$200.

S. & W. Co.'s Tee Balls

Arrow-Tee Balls. Can be set to show direction of play. Enameled white and having small red arrow. \$1 per pair, \$10 per dozen pair.

Composition. Made with composition golf ball top. White enameled. \$1.25 per pair.



Arrow-Tee Ball

Teeing Plates

No. 10. Round metal plate to lie flush with ground; drop forged. \$1 per pair.



No. 10

Composition Tee Ball

S. & W. Co.'s Golf Ball Retriever

Bamboo pole; wire basket. \$3.

Hole-Cutters

"Bogey" Hole-Cutter (English make). Notched teeth. The easiest working, cleanest cutting and most durable Cutter made. \$14 each.

"Bogey" Hole-Cutter

The S. & W. Co.'s (Domestic). With point for centering, and device for ejecting earth and sod after cutting clean hole. \$12 each.

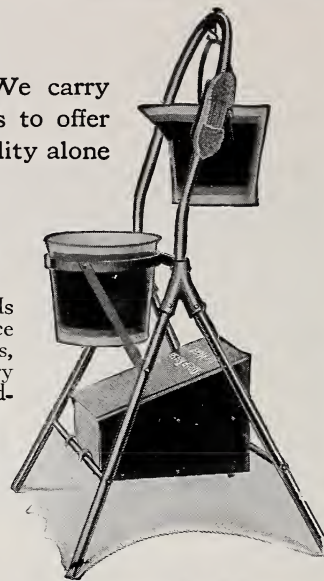
Turf Repairing Hole-Cutters

Ten-inch Turf-Repairer. Cuts out a weedy or bare patch on the putting-green and enables you to replace it with a disc of good turf. Imported. \$18 each.

Three-inch Turf-Repairer. For removing small weed-patches. \$10 each.

The Wirt Golf Tee Stand

An improvement which adds considerably to the convenience and enjoyment of the players, while its appearance is very pleasing. As illustrated, handsomely painted in green, each \$22.50. Without Trash Box, \$17.50. Painted club colors, \$2 extra. Painted with hole numbers, \$2 extra.



Wirt Golf Tee Stand



Golf Ball Rack

Golf Ball Racks

Useful on much-frequented courses. Each player or one player in a party drops his ball in the rack when he arrives, his relative position being determined by the position of the ball in rack. Substantially made of iron, heavily japanned. For 36 balls. \$25 each.

Golf Tee Towels

These are of the finest grade; they will stand hard wear, and in use they will give off no lint. Fitted with brass eyelets. Size 13 x 21 in. 25 cts. each, \$3 per doz.

Towel Holders

Metal clips for holding towels of ordinary type. 50 cts. each, \$5 per doz.

All prices subject to change without notice. All orders will be accepted only subject to our ability to supply the goods. Prices shown are those in effect February 15, 1925.



A 10-inch turf repairing Hole-Cutter in use

Golf-Marking Flags

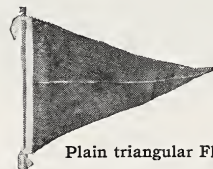
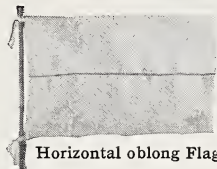
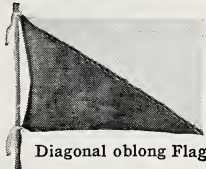
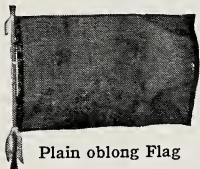


NUMBERED FLAGS FOR PUTTING GREENS. Best quality bunting, with numbers from 1 to 9 and from 10 to 18. These are oblong in shape, 12 by 18 inches; we offer them in sixteen color combinations as follows:

Color of flag	Color of numeral	Color of flag	Color of numeral	Color of flag	Color of numeral
*Red.....	White	Blue.....	White	Black.....	Princeton orange
*White.....	Red	Yellow.....	Red	White.....	Harvard red
Red.....	Yellow	Green.....	White	Harvard red.....	White
Red.....	Green	Green.....	Red	Black.....	Gold
White.....	Blue	Princeton orange.....	Black	Gold.....	Black
White.....	Green				

Numbered flags: 75 cts. each, \$6.60 for set of 9, \$13 for set of 18

NOTE.—Many clubs with eighteen greens find it convenient to use one color combination on the first nine, and another on the second nine—say white numerals on red going out and red numerals on white coming in.



PLAIN FLAGS FOR PUTTING GREENS OR FOR DIRECTION, without numbers. Best quality bunting. We offer these in two shapes, oblong and triangular, and in the following colors:

Oblong flags, 12 by 18 inches, 60 cts. each

*Red	*White	Blue and gold, diagonal
Blue	Yellow	Red and blue, diagonal
Green	Harvard red	Red and white, horizontal
Princeton orange	Yale blue	Blue and white, horizontal
Red and white, diagonal		Yellow and white, horizontal
Blue and white, diagonal		Blue and gold, horizontal
Yellow and white, diagonal		Princeton orange and black, horizontal
Princeton orange and black, diagonal		Red and blue, horizontal

Triangular flags, 12 inches at widest part, 18 inches long

*Red	Yale blue
*White	Red and white, horizontal
Blue	Blue and white, horizontal
Yellow	Yellow and white, horizontal
Green	Blue and gold, horizontal
Princeton orange	Orange and black, horizontal
Harvard red	Red and blue, horizontal

Unnumbered flags, oblong and triangular, 60 cts. each, \$5.25 for set of 9, \$10.35 for set of 18.

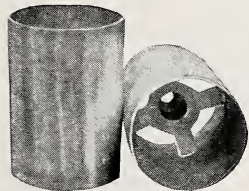
*Red flags with white numerals, white flags with red numerals, and plain red and white flags are always in stock for immediate shipment. Other color combinations listed are usually available for prompt shipment, although from one to two weeks may be necessary to make them specially to order.

Metal Marking Discs



Painted red and white and numbered from 1 to 18. The iron shaft is strongly fastened to the disc.
Heart Shape, standard size, 44-in. shaft, for the greens. \$2.50 each, \$27.50 per doz.
Heart Shape, miniature size, 14-in. shaft, for putting courses and clock golf. \$1.50 each, \$16.50 per doz.

Golf Hole-Rims



S. & W. Co.'s Aluminum Mudless

S. & W. Co.'s Aluminum Mudless Hole-Rim. This Hole-Rim is made of pure cast aluminum; it is extremely strong and will last indefinitely. It is made to accommodate flag-poles that are fitted with either spike or ferrule. Due to its peculiar construction, the accumulation of mud or water in the rim is prevented. \$2.50 each, \$20 for set of 9, \$40 for set of 18.

No. 31 Hole-Rim. Galvanized iron. For flag-poles with ferrule. \$1.50 each, \$13.25 for set of 9, \$26 for set of 18.
No. 30 Hole-Rim. Galvanized iron. For flag-poles with spike. \$1.50 each, \$13.25 for set of 9, \$26 for set of 18.



No. 20. For lining holes in putting green. The cross-piece prevents ball from falling to bottom of hole. For spike. 75c. ea., \$6.75 for set of 9, \$13.50 for set of 18.

Wicker Balloon Flags



These are very visible, being large, yet light and durable. Well painted with three coats of best enamel. Length, 8 feet. \$6.50 each.

Bamboo Poles



Bamboo Flag-Poles. These are tapering, 18-foot Poles and will be cut to any length preferred; the usual is 8, 10, or 12 feet. Unless instructed, we ship in original lengths for the club to cut to the length that best suits them. With spike attached, \$2 each, \$22 per doz.; with brass ferrule attached, \$1.50 each, \$17.50 per doz.

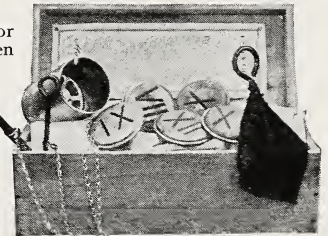
Bamboo Poles, Plain. For poling greens; 18 feet long. 50 cts. each, \$5 per doz., \$40 per 100.

Cherokee Holders for Flag Poles (Removable)

These are spikes which are readily attached to bamboo poles by means of a screw-driver. \$1.35 each, \$14.75 per doz.

Clock Golf Outfit

Clock golf is excellent for practice in putting. Eighteen figures, indicating tees, are placed in a circle of any size that the lawn area admits—20 to 24 feet in diameter is a usual size; the hole is cut in the center. The assortment consists of eighteen numerals of forged iron, miniature flag-pole, flag, and hole-rim cup. \$12.50.



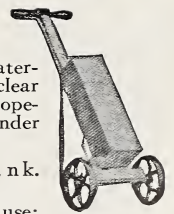
S. & W. Co.'s Eureka Wet Tennis Markers

For grass or clay courts. Uses liquid water-slaked lime. Makes clear cut line. Simple to operate. Flow of liquid under instant control.



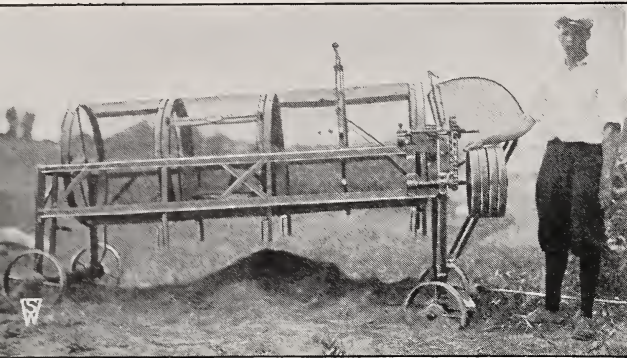
Vertical, small tank. \$22.50 each.

Horizontal, for club use; large tank. \$30 each.



Stump & Walter Co.'s GOLF TURF

PRICES SUBJECT TO MARKET CHANGES



"Rotary" Soil Screen, Geared Model. Price, \$190

Rotary Soil Screens

For quickly and efficiently screening compost for top-dressing turf, also for removing stones and large particles from potting soil, sand, gravel, ashes, rotted manure, etc. Strongly made of heavy woven wire, so well balanced that very little power is necessary to operate them.

"Rotary" Geared Model. As illustrated. Furnished with special chain gearing to run with any engine. Describe size and speed of your drive wheel. **\$190.**

"Rotary" Standard Model. Works from any 1½ horse-power engine with a 4-inch pulley wheel running at 500 r.p.m. Identical with the geared model except that it has no chain-gear; the tight and loose pulleys are bolted directly on the driving-shaft. **\$170.**

"Junior Rotary" Geared Model. The revolving cylinder consists of one section only, instead of three as in the type shown. The framework is shorter than that of the larger machine, but in other respects it is identical. The capacity is about one-quarter less than that of the larger machine. We ship in ¼-inch mesh unless any other is specified. **\$150.**

"Junior Rotary" Standard Model. A one-section type without gearing. **\$125.**

All the above are equipped with a crank handle which may be used should your power fail or if you only use the machine occasionally. It is easily revolved by hand. Prices are f.o.b. New York.

Capacity. Rotary Geared and Rotary Standard models will take care of average soil about as quickly as two men can shovel into the hopper, screening from 1½ to 5 cubic yards per hour, the rate depending, of course, on the condition of the material—moist, heavy soil screens slower than dry, light soil.

Junior Rotary Screens will screen 1 to 3 cubic yards per hour.

Operating. Best source of power is an engine developing 1½ horse-power with 500 revolutions per minute of a 4-inch pulley. The standard models are built for this. All models, however, may be rotated by hand; or power may be taken by means of a belt from the rear wheel of an automobile, from a tractor or electric motor.

Portability. Seven-inch wheels make the apparatus sufficiently portable to be of service on any part of a golf-course or estate.

Mesh. Specify the mesh when you order. We recommend ¼-inch, ½-inch, and ¾-inch as the most desirable for the three sections, and we send these unless instructed otherwise. We can supply extra screens at any time; these may be bolted in place in a few minutes. Junior models are shipped in ¼-inch mesh unless specified.

Which Machine to Purchase. We advise the large machine for construction work and for maintenance on an eighteen-hole course. We recommend the Junior Rotary Soil Screen for maintenance on a nine-hole course.

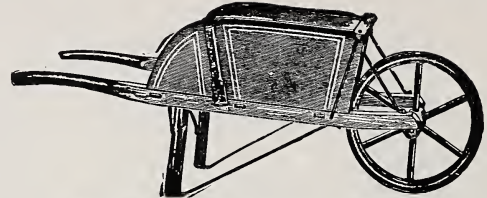
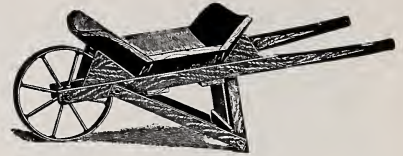
If you have an engine developing the horse-power indicated above at the specified revolutions per minute, buy the Standard type. If your power is different, describe it to us and order a Geared model.

Accessories for Rotary Soil Screens

- Screen Sections.** Any mesh from ⅛ to 2 inches.
 - 36 inches long..... Pair, \$22 50
 - 24 inches long..... Pair, 20 00
- Gear Chain**..... Per foot, 50
- Gears.** 27 teeth \$5.50, 22 teeth \$4.50, 5 teeth \$2.25.
- Complete parts** to convert Rotary Standard Model into Rotary Geared Model..... Set, 22 00
- Pulley** for Fordson Tractor. Attaches to the tractor turning it into a power plant. Diameter, 4 in., width, 4 in..... 30 00
- Bucket Elevator** for feeding Rotary Soil Screens. Built in when Geared or Standard models are constructed..... 140 00

Canal Barrow

The ideal Wheelbarrow for landscape and golf construction work. The wheel is of steel and the body is strongly made, superior to the ordinary Barrow in common use. Price, \$5.



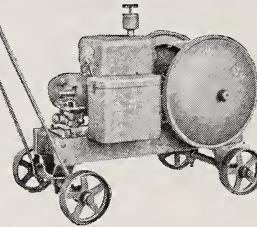
S. & W. Co.'s Garden Barrow

One of the most useful articles on the list of garden and lawn tools. Materials are selected oak, mortised and bolted together, strengthened with six iron braces. Made substantial, light and for long service. Wheels with 3-inch tread.

SIZE	Front Width	SIZE OF BOX		Rear Width	SIZE OF WHEEL		Price
		Depth	Length		Diam.	Tread	
Medium.....	18½ in.	12 in.	26½ in.	23 in.	20 in.	3 in.	\$8.00
Regular.....	20 in.	12 in.	28 in.	24 in.	22 in.	3 in.	9.25

S. & W. Co.'s Portable Engine

For use with the Rotary Soil Screen. Develops 1½ horse-power on a 4-inch pulley, turning at 500 revolutions per minute. Battery equipped. Will run for 5 hours on a gallon of gasoline.



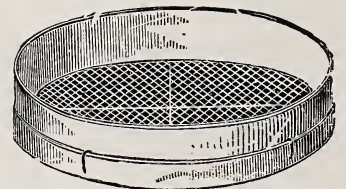
Engine mounted on wheeled truck, as illustrated, \$85.

Engine only, \$75.

Pulley Belt for connecting engine with screen, \$15.

Hand-Sieve

For covering newly sown seed there is no better way than to riddle on to it a very light covering of soil. For this purpose we offer Hand-Sieves, 20 inches in diameter and in ¼-inch mesh, although any mesh specified may be ordered. 20-inch Steel (heavy), \$2.50 ea.



Flat Screen

Handy for compost, soil, sands, gravel, etc. Extra-heavy galvanized wire; spruce frames, painted grey. Size, 66 in. x 26½ in., x 5 in. ½-in. mesh. Price \$16.

Stump & Walter Co.'s GOLF TURF

PRICES SUBJECT TO MARKET CHANGES

The Champion Sod Cutter (Horse-Drawn)

The Champion Sod Cutter is the result of many years of practical experience and is the most wonderful labor-saving device ever invented. This machine will cut in one hour as much sod as two men can cut in a day; in a day the Champion



will cut from 25,000 to 35,000 feet of sod, and at this rate you can save the price of a machine in a short while.

This machine is so constructed that it can be adjusted to cut the sod the one uniform thickness, 1 to 2 inches, 12 inches wide. This is very important, especially when a vast amount of sod is to be laid. One man can lay as much sod as three or four men can by the old method of cutting. \$50 each.

Solid Steel Scrapers

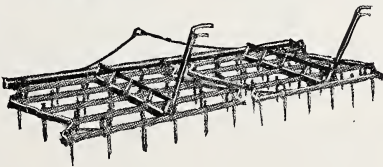
Invaluable for all grading work, lawn construction, road making, etc. For use with horse or tractor.

No.	Width	Capacity	
1	32 in.	7 ft....	\$14 00
2	29 in.	5 ft....	13 50
3	26 in.	3 ft....	13 00



All-Steel Lever Spring Spike Tooth Harrow

These closed end harrows are built for hard usage. Side rails connect the ends of the teeth bars in each section. This prevents the ends from catching on obstructions and bending the bar out of shape.



For One Horse.

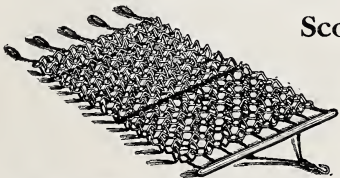
With 25 Teeth in One Section, Spreading. 4 ft.....\$13 00
With 30 Teeth in One Section, Spreading. 5 ft..... 14 00

For Two Horses.

With 50 Teeth in Two Sections, Spreading. 8 ft..... 26 50
With 60 Teeth in Two Sections, Spreading. 10 ft..... 29 00

For Tractor or Three Horses.

With 75 Teeth in Three Sections, Spreading. 12 ft..... 40 00



Scotch Chain Harrow

Hundreds of wrought-iron links are woven into what is practically a blanket of chain. This arrangement is ideal in smoothing land as a final preparation for grass seeds; it may also be drawn over the

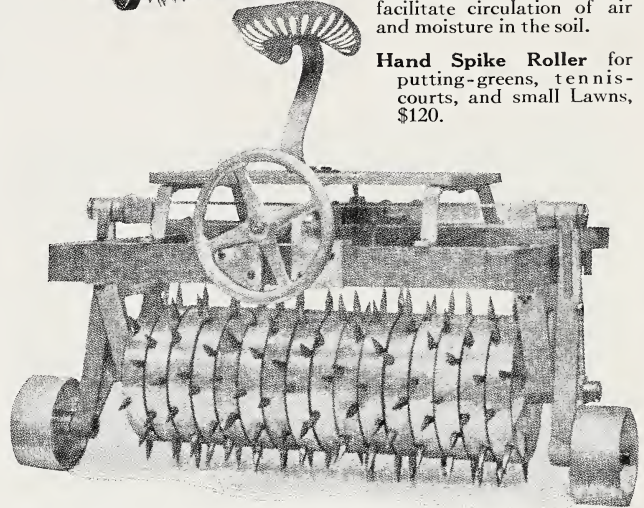
soil after seeds are distributed for the purpose of covering them. Used on driveways and race-tracks, it smooths the surface, eliminating ruts and footprints. The Scotch Chain Harrow is made in three sizes, the Small for one horse, the Medium for two horses, and the Large for tractor. Small size, 5 x 6 ft., \$35; Medium, 6 x 7½ ft., \$45; Large, 7½ x 7½ ft., \$55.

Spike Rollers

Invaluable for the greenkeeper, groundsman, and large lawn owner. The secret of fine turf is largely a matter of continued top-dressings; these top-dressings are much more effective if their application is followed by a good spike-rolling and then a brushing.

This places the compost just where it is needed, namely 1 and 2 inches down into the soil. An occasional spike-rolling will open "hide-bound" turf, correct the results of excessive heavy rolling, and facilitate circulation of air and moisture in the soil.

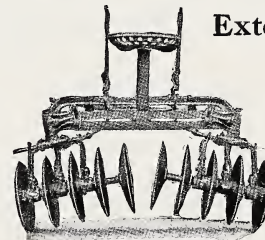
Hand Spike Roller for putting-greens, tennis-courts, and small lawns, \$120.



Horse Spike Rollers. For golf fairways, polo-fields, and large lawns. 3 ft. 1-horse (1,600 lbs.) \$375; 5 ft. 2-horse (2,000 lbs.) \$425.

Extension Disc Harrow, with Reversible Gangs

Square braces take the heavy, backward thrust of the gangs. Levers are bolted to the frame and are very rigid. The frame is of angle steel, slotted to allow adjustment of gangs. These can be shifted from one side to the other or just turn them around on the pivot quickly and easily. Each With ten 16-inch Solid Discs... \$60 00



S. & W. Co.'s Lime and Fertilizer Sower



This Force Feed Lime and Fertilizer Sower is the most perfect machine on the market for sowing all brands of commercial fertilizers. Nitrate of Soda, Emerald Grass Fertilizer, Fairway Fertilizer, Anti-Clover Manure, Pulverized Limestone, Sheep-Manure, Bone Meal, Dry Wood Ashes, etc. Hopper holds 10 bushels. Actual width of sowing is 8 feet. Capacity from 50 to 4,500 pounds. The screen in the hopper and revolving agitator prevents clogging and packing of material on the feeds and insures an even distribution of fertilizers. All feeds can be instantly shut off or opened to any desired amount. Has two 30-inch wheels with 4-inch concave tires. Shipping weight, 360 lbs. \$65 each.

Stump & Walter Co.'s GOLF TURF

Manure Spreader

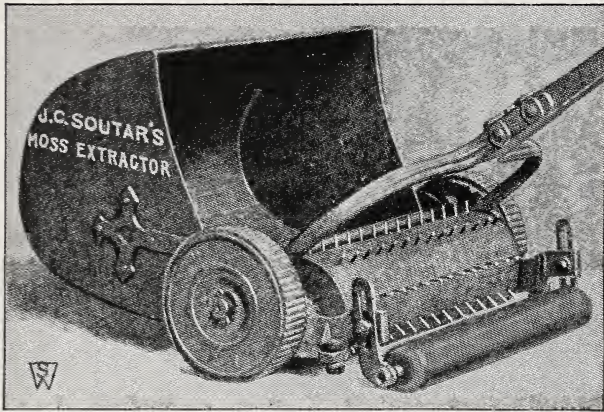
All kinds of manures are handled to advantage with this machine. It has a tight bottom, is low down, is easy to load, is easy to draw and is narrow enough to be taken into the stable for loading from the gutters if desired. It is well adapted to every use to which a Spreader can be put and for dairy and hilly farms it is unsurpassed. Front wheels turn auto style and track with rear ones. Friction is minimized by roller and self-aligning bearings. Apron is endless, ratchet driven. Beaters are steel and have improved chain drive. Capacity 40 bushels, level full. With side board extensions, 75 bushels heaped.

Spreader only.....\$215 00
Side board extensions, per pair..... 5 00

Carts and Wagons

One-Horse Farm Cart. Wheels have 4-inch tires. Box 5 feet 10 inches long, 35 inches wide, and 17 inches deep. Capacity 1,400 pounds. Price, \$95.

Two-Horse Farm Wagon. Very strong construction. Body 11 feet 6 inches long. 40 and 44-inch wheels with 3-inch tires. Price, \$198.



MOSS EXTRACTOR. Invaluable wherever moss or lichen infects the surface of lawns and putting- greens: combs, aerates, and greatly benefits the grass. Quicker, more effective, and less damaging than raking. Price, \$75.



HOLE-TIN RAMMER and LIFTER. Made in wrought and cast iron. Price, \$2.



RIM SETTER. For setting rim and leveling edges. \$2.50 each.



HOLE-TRIMMING SCISSORS. Specially curved Shears for trimming the grass adjacent to the hole and rim. Pair \$1.75.



Turf-Edgers

Solid Welded Steel Edger. Socket handle; made of the very best steel; imported English. 8-inch, \$2.50 each; 9-inch, \$3 each.

Half-Moon. Solid steel, with a polished handle. \$1.25 each.

Sundry Small Tools

Finest quality materials in each instance

AXE. Medium weight; man's size.....	\$2 50
HATCHET	1 25
MONKEY WRENCHES. For the tractor. 8-in.....	1 00
10-in.....	1 25
STEEL PLIERS, with wire cutter. 6-in.....	1 00
7-in.....	1 25
SCREW DRIVER. Powerful make	
4-in.....\$0 50	7-in..... 80
5-in..... 65	10-in..... 1 00
CROWBAR. Steel, with wedge point	
10 lbs.....\$1 50	20 lbs..... 2 50
15 lbs..... 2 00	24 lbs..... 3 00
HAMMER. Best steel.....	1 00

George Low Sand Rake

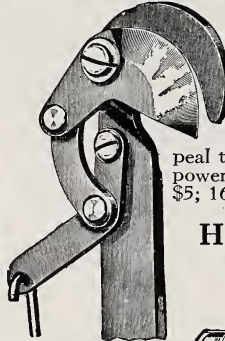
For Traps on a Golf-Course

Invented by one of the best-known golf professionals in the country. Ridges the sand, prevents the ball being teed up in the sand, compels a player to use his niblick instead of rolling his ball with a putter. Gives the traps a wonderful appearance. Price, \$2.50; doz, \$27.50.



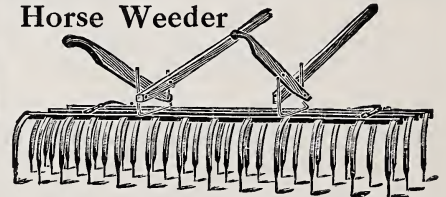
Compound-Lever Tree Pruner

Working parts, being made from forgings, are very strong, without being unnecessarily heavy, and the strength, durability, easy cutting qualities of this tool appeal to all who have occasion to use a strong and powerful Pruner. 10 ft., \$4.75; 12 ft., \$4.85; 14 ft., \$5; 16 ft., \$5.25.



Compound-Lever Pruner

Horse Weeder

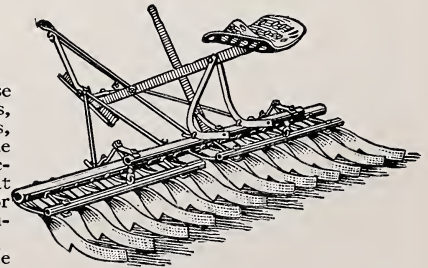


This has the same effect on a large scale as a specially sharpened rake has on small areas. Is a very valuable implement for the final preparation of soil for grass seeds, although its primary object is to stir the land and destroy weeds among farm crops. To straddle rows one or more teeth are removed. One horse pulls it. Price, \$20.

Acme Pulverizing Harrow

A general-purpose Harrow that crushes, cuts, turns, smooths, and levels all in one operation. For reducing clod land into that fine tilth necessary for proper seeding; valuable on fairways.

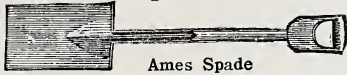
All sizes are flexible except Nos. G and H.



No.	Each
G For One Horse, cuts 3 ft.....	\$15 00
H For One Horse, cuts 4 ft., 4 in.....	23 00
23 For Two Horses, cuts 6 ft., 6 in.....	31 00
26 For Two Horses, cuts 8 ft., 6 in.....	36 50
24 For Four Horses, cuts 13 ft., 6 in.....	67 00
25 For Two Horses. For Orchards.....	43 00

Implements of General Use on a Golf-Course

Spades



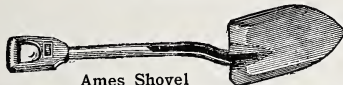
Ames Spade

Ames Spades are the same grade as the celebrated Ames Shovels. Each D Handle and Long Handle.....\$2 50
S. & W. Co.'s Spades are the same grade as S. & W. Co.'s Shovels. Each D Handle and Long Handle.....\$2 00



S. & W. Co.'s Reinforced Nursery Spade. A well-made Spade, being strongly and heavily strapped close up to the "D" handle. For all-round garden work, and will last a lifetime. \$2.50 each.
Boys' Spades. Special finish....\$1.75 each

Shovels



Ames Shovel

Ames Shovels are the best manufactured; give best service. Each Square Point, D Handle.....\$2 50 Round Point, D Handle..... 2 60 Long-Handle Shovels same price.
S. & W. Co.'s Shovels. Square Point, D Handle....\$2 00 Round Point, D Handle.... 2 10 Long-Handle Shovels same price.



Screen Scoop. Useful for removing stones and rubbish from small areas of soil. \$2.50 each.



Galvanized Pails or Buckets. Extra-heavy grade. 12-qt. 95 cts. each, \$10.50 per doz.; 16-qt. \$1.25 each, \$13.75 per doz.

Potato Hook. Six-tine, diamond back. Useful for a variety of purposes, particularly for eliminating scutch grass from sand-traps, etc. \$1.25 each, \$13.75 per doz.



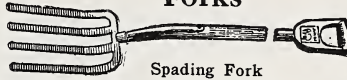
Draw, or Garden. Sizes for boys, ladies, and men.

	Each	Doz.
5-in.....	\$0 90	\$9 00
6, 6½, 7, and 7½-in.....	1 10	11 00



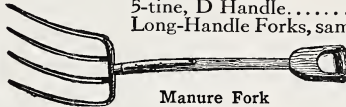
Grub Hoe. Tempered tool steel. Polished bit. 3¼-inch cutter. Weighs 3¼ pounds. Painted red. \$1.25 each.

Forks



Spading Fork

Spading Forks. Best grade; tines spear-pointed with diamond-shaped backs; handle strapped both sides. Of superior quality and very strong. Each 4-tine, D Handle.....\$2 00 5-tine, D Handle..... 2 50 Long-Handle Forks, same price.



Manure Fork

Manure Forks. Best grade; strong oval tines. Long-Handle Forks, same price. Each 4-tine, D Handle.....\$2 00 5-tine, D Handle..... 2 15 6-tine, D Handle..... 2 40

Hay Forks.

Best grade; strong oval tines, made only with long handles. Each 3-tine, Long Handle.....\$1 30 4-tine, Long Handle..... 1 45

Turf Prying Fork.

Specially prepared for hand-forking greens; six short tines.....\$3 00

Picks and Mattocks (With Handles)



Contractors' Picks. Both ends pointed. Tempered tool steel. \$2.25 each.



Cutter Mattocks. Tempered tool steel. Painted red. Polished edges. \$2.50 each.



Pick Mattocks. Tempered tool steel. Painted red. Polished ends. Weight about 6 lbs. \$2.25 each.



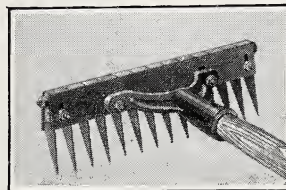
Garden Line Reels

Malleable Iron. Holds 100 feet. \$1.25.

Eureka. Galvanized steel. Single, 500-ft. size, \$3.25. Double, 1,000-ft. size, \$4.

Garden Line

Best Braided Linen. 100 feet, one length, \$1.50. 200 feet, one length, \$2.75.



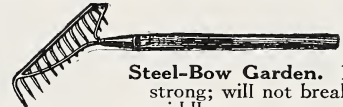
Rich Lawn Cultivator

This consists of a heavy, solid head, carrying 14 sharp-pointed and sharp-edged knives. A forward pull of the cultivator causes the knives to enter the turf, and a backward push clears them. The cultivator tears out clover or crab-grass, and it roughens the turf to prepare it for re-seeding. It is valuable, too, in those sections where Bermuda grass is a turf weed, quickly tearing out the objectionable runners. Price, with handle, \$6.50.

Rakes



Reversible Steel. Suitable for lawn and garden. Has 24 teeth. 75 cts. each.



Steel-Bow Garden. Extra strong; will not break in the middle. Each

12-tooth.....	\$1 25
14-tooth.....	1 40
16-tooth.....	1 50



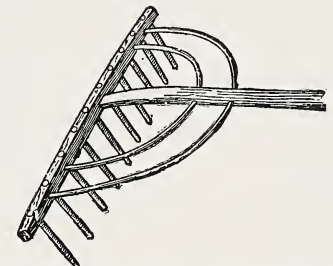
Steel Garden. Cut from one piece of steel; strong and durable. Each

10-tooth.....	\$1 00
12-tooth.....	1 10
14-tooth.....	1 20
16-tooth.....	1 50

Steel Gravel. Like the Garden Rake. Made substantially, with short teeth. Each

14-tooth.....	\$1 25
16-tooth.....	1 50
18-tooth.....	1 75

A charge of 50 cts. per Rake is made when any of the above are ordered specially sharpened for renovating turf.



Wood, Hay and Lawn. Made light and substantial, with tubular steel bow; does not break like the wood bow.

	Each	Doz.
12-tooth Hay.....	\$1 20	\$12 00
24-tooth Lawn.....	1 50	15 00

Bamboo Rake. Japanese manufacture. Weighs only 20 ounces; cleans the turf as gently as the human hand. Each, 75 cts., doz., \$8.25.

Bamboo Baskets

Better known as Long Island Potato Basket. Woven split rattan; handle opening under rim. Well made. A very useful type for a golf-course.

½-bus. size.....	\$1 75
Bus. size.....	2 25

Rich Lawn Cultivator Renovating Rake

This consists of a heavy, solid head, carrying 14 sharp-pointed and sharp-edged knives. A forward pull of the cultivator causes the knives to enter the turf, and a backward push clears them. The cultivator tears out clover or crab-grass, and it roughens the turf to prepare it for re-seeding. It is valuable, too, in those sections where Bermuda grass is a turf weed, quickly tearing out the objectionable runners. Price, with handle, \$6.50.



Bamboo Basket

Sundry Requisites

No. 25 Planet Junior Combined Hill and Drill Seeder, Double-Wheel Hoe, Cultivator and Plow

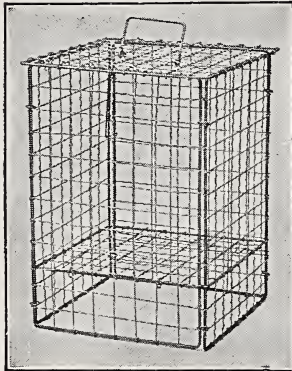
Price, \$22.50



This machine is invaluable for three golf purposes: for the construction of a turf nursery from Bent seed we suggest that the seed be sown in parallel rows 12 inches apart, the rows kept carefully weeded, when at the end of a year a fine mat-like turf will be available; for construction or repair work. It may be used to hoe between the rows of a Creeping Bent Stolon nursery. Another invaluable use for the Seeder is in the club's vegetable-garden: seeding in a straight line, and at the proper depth.

Burners for Leaves, Paper, and Rubbish

The best receptacle used for burning leaves, papers, and all kinds of rubbish. This handy knock-down Burner is a safeguard against many fires that have their origin in the burning of rubbish in the open. The Burner is extra strong, manufactured of heavy galvanized steel wire, reinforced with iron supports. Made to give life-long satisfaction. We supply this Burner in two sizes.



No. Square	Height	Each
1...	15 in... 22 in...	\$3 00
2...	17 in... 29 in...	4 00

S. & W. Co.'s Soil Tester for Lime

Shows at a glance if your soil is sour and needs lime. It tells you how much lime is already in your land, and indicates exactly what further quantities are needed to grow a particular crop.

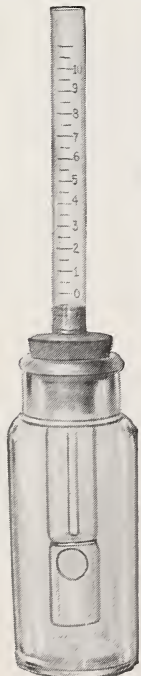
The apparatus has been devised by Dr. Earp-Thomas, well known as the producer of Farm-germ, now so widely used by successful farmers. The very simple details of its operation are described in a leaflet written by Dr. Earp-Thomas, which accompanies the set. The S. & W. Co. Soil Tester may be carried in the pocket, and with it accurate soil tests may be made right in the field instead of in a scientific laboratory.

A measured sample of soil is placed in the bottle, water is poured down the graduated tube to fill a small chamber, and an acid solution, which is furnished, is poured into a receptacle. The stopper with its attachments is replaced and the bottle lightly shaken; gas is generated in the bottle and the pressure causes the water to ascend in the graduated tube to indicate the total amount of lime that you have in the top six inches of your soil. A table furnished with the set indicates the quantity of lime needed by the particular crop.

You add the difference—exactly, because more than the correct quantity would be wasting lime, and less would not give results.

The cost of the outfit is low, and it may be more than saved the first year out of your annual lime order.

Price complete, postage prepaid, \$5



Stumpwall Weed Extractor for Lawns

THE RAPID CRAB-GRASS REMOVER



Patent applied for. A 12-inch hand tool designed to extract crab-grass, star-grass, chick-weed, self-heal and plantain from putting greens and fine lawns. In removing crab-grass, a skilled greenkeeper will insert his pocket-knife under the plant, sever the root, and with thumb and knife remove the crab-grass with the minimum disturbance to the surrounding turf.

Experience proves that it is difficult to instruct young unskilled helpers to do the same. Instead the tendency is to gouge out the weed, causing instead a large bare patch. The Stumpwall Crab-grass Remover enables an inexperienced worker to do mechanically what an experienced greenkeeper can do by hand. In practice it is twice as fast. \$1.50 each, \$16.50 per doz.

S. & W. Co.'s Sod Perforator

The best low-priced device for renovating bad spots in lawns, terraces, greens, etc. Before sowing grass seed, use the Sod Perforator. The operation permits the seed to enter the soil, where it is covered at about the correct distance from the surface. The seed will germinate and come up uniformly, producing a vigorous growth of rich grass. The spikes are firmly set in an oak block, made in two halves and put together with screws. The handle is the right thickness and length. 12 x 12 in., \$4.50 each.

S. & W. Co.'s Iron Sod Tamper

This Sod Tamper is in demand for the laying of sod. It is used on putting-greens and terraces; also in the spring for compacting the sod after the frost has disappeared. The Tamper is square. A wooden handle of right size is firmly secured to the Tamper.



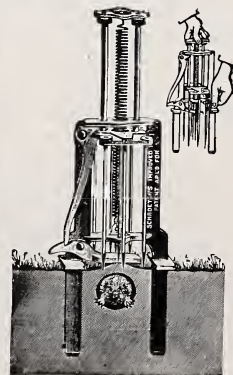
Size ins.	Weight lbs. each	Price	S. & W. Co.'s
8 x 8	17	\$2 75	Iron Tamper
10 x 10	20	3 00	

Mole Traps

Schroeder Improved No. 1. It has a rest on top for a weight, also eight sharp prongs and a strong spiral spring. \$2.50 each, \$25 per doz.

The Rittenhouse. The simplest, safest, and surest mole trap ever invented. Self-setting. No danger of its going off unless the trigger is touched. Made of all steel and tinned. Six in a crate. The spears are spring steel, therefore not so long as soft steel. \$1.10 each, \$11 per doz.

Reddick's. \$1.25 each, \$12 per doz.



MO-LO Will Clear Your Lawn of Moles and Field Mice in a Few Nights

Directions:—Punch a hole in top of run, drop in one MO-LO and cover lightly. Do this every eight or ten feet. Keep MO-LO away from children or domestic animals. It is poisonous. Package, 25 cts.

Stump & Walter Co.'s GOLF TURF

Steel Disc Smoothing Harrow

The frame measures 6 feet 8 inches by 6 feet, and has four sets of rollers, having 58 discs 8 inches in diameter. A very useful Harrow, \$40 each.



Books for the Golfer

Mailed Free of Charge at Prices Given

- SOME ESSAYS ON GOLF COURSE ARCHITECTURE.** Each By H. S. Colt and C. H. Alison. 69 pages. Illustrated with photographs and plans of holes in Europe and America. \$1 75
- GOLF SIMPLIFIED—CAUSE AND EFFECT.** By Dave Hunter of the Essex County Country Club. 43 pages. A new and simplified method of instruction in the game, whereby one idea corrects all faults common to the golfer. Illustrated with photographs specially posed by the author. 1 00
- LAWN-MAKING.** By Leonard Barron. 176 pages. A practical manual, illustrated with photographs and dealing with every detail of the subject. 1 75
- GOLF FUNDAMENTALS.** By Seymour Dunn, of Lake Placid, N. Y. 283 pages. The science of the game is analyzed in a masterly fashion and the book is filled with 453 diagrams, photographs and detailed moving picture films of the principal strokes. 8 00
- A COMPLETE GARDEN. A New Book on Landscape Gardening.** Tells what, when, and how to plant in any place, for any purpose. Every phase of harmonious landscape architecture and gardening, in a book of more than 400 pages with numerous illustrations. A Complete Garden. By Albert Taylor, M.S.A. 6 00
- TURF FOR GOLF COURSES.** By C. V. Piper and R. A. Oakley. This is an authoritative and practical treatise on the production and maintenance of grass turf. 3 00

Turf Brooms

- Birch Brooms or Besoms.** Superior make with handles. \$1.25 each, \$12.50 per doz. Without handles, 75 cts. each, \$7.50 per doz.
- Bamboo Brooms.** These are very light. Do the work without injury to the grass. Complete with handles. \$1.50 ea., \$15 per doz.

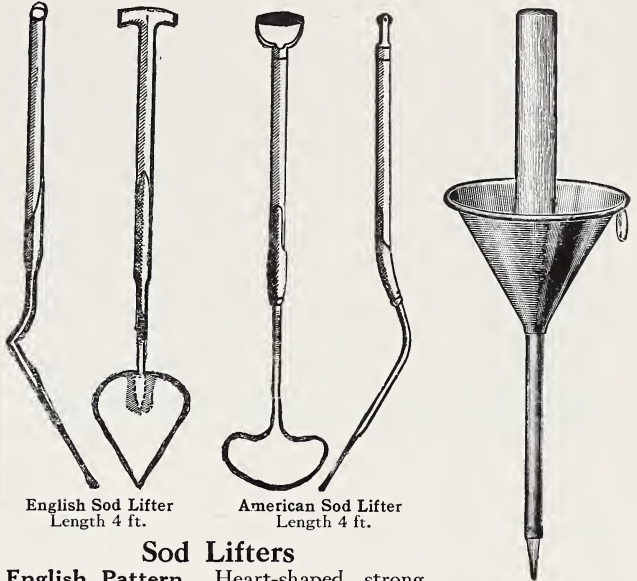
Watering Carts

- For sprinkling roadways and for applying chemicals to large areas of turf.
- | | |
|----------------------------------|----------|
| 175 gallons, one horse. | \$200 00 |
| 450 gallons, two horses. | 595 00 |
| 600 gallons, two horses. | 650 00 |

The "Out-U-Kum" Weed Puller

An Entirely New Principle

A slight Push and Pull thoroughly loosens the surrounding soil and removes not only the weed, but the entire root. Made of refined malleable iron, highly polished. Black enameled ferrule and select waxed hardwood handle. \$1 each.



English Sod Lifter
Length 4 ft.

American Sod Lifter
Length 4 ft.

Funnel and Skewer
Length 12 ins.

Sod Lifters

- English Pattern.** Heart-shaped, strong, and highly efficient. \$8.50 each.
- American Pattern.** Preferred by many on account of its light weight. \$2.25 each.
- Racing Irons.** English make. Used to produce the vertical cut when lifting sod by hand. \$6.50 each.

Stump & Walter Co.'s Funnel and Skewer

Specially designed for applying carbon bisulfide through the turf into the soil. \$1.50 each.
Carbon bisulfide will burn grass; hence it is necessary to employ a device of this nature to convey it through the grass down into the soil.



Narrow Trowel

Of use in extracting dandelions and other weeds from turf. 5-in. 20 cts. each; 7-in. 30 cts. each.



S. & W. Co.'s Special Chisel Knife

Similar to an asparagus knife, but shorter. Made especially by us for extracting weeds from putting-greens. \$6 per doz.

NOTE

The benefit of a Grass Seed Expert, who has made a life study of this subject, is at your disposal.

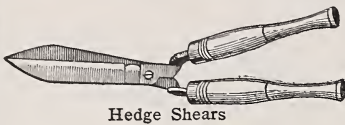


Cleveland Lawn Weeder

Is simple to operate and not only saves the back, but is actually a pleasure to use. The cut is a good illustration, showing how to work it. \$1.50 each, \$15 per doz.

Stump & Walter Co.'s GOLF TURF

IMPLEMENTS, continued



Hedge Shears

Plain	Price
8-in. blade.....	\$2 90
9-in. blade.....	3 25

Hedge Shears

Solid steel blade, crucible tool-steel, tempered to hold an edge. Give good service. Shears with notch are the best for cutting heavy stems of hedge plants.

	Price	With Notch	Price
10-in. blade.....	\$3 75	8-in. blade.....	\$3 25
Ladies'.....	2 50	9-in. blade.....	3 50
		10-in. blade.....	4 25

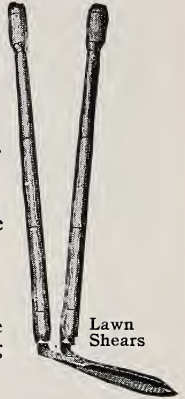
S. & W. Co.'s Grass Shears

A very simple but practical locking device holds the Shears together. Made of the best crucible tool-steel; polish finish. One size only, 6½-in. blade, \$2.50 each.

Western Grass Shears. Made of good quality tool-steel. A one-piece Shears. Plain finish, 6-in. blade, \$1.50 each. A leather shield is furnished with each Shears.



Grass Shears



Lawn Shears

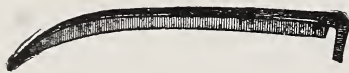
Grass Edging or Border Shears

Designed to trim the overhanging grass on borders around flower-beds and walks. 9-in. blades of high-grade tool-steel; polished handles and blades. Without wheel, \$5.50 each; with wheel, \$6 each.

Lawn Shears

Designed to cut grass under hedges, fences, grape arbors, and flower-beds or shrubs. 9-in. blades of high-grade tool-steel, polished handles, and blades. Without wheel, \$6 each, with wheel, \$6.50 each. NOTICE: When shipping the above Shears, unless stated on orders, we send Shears with wheel.

Scythes



Imported English. Has a riveted back, broad, thin, light blade. Best Scythe for cutting grass, rye, oats, etc.

30-in.....	\$2 75	34-in.....	\$3 25
32-in.....	3 00	36-in.....	3 50

The benefit of a grass-seed expert—one who has made a life study of this subject—is at your disposal



The Little Giant. Has a ribbed back, is heavier and better adapted to rough work.

32-in.....	\$2 25	36-in.....	\$2 60
34-in.....	2 40	38-in.....	2 80

Scythe Snath, or Handle. The very best, with patent socket. \$2.25 each.

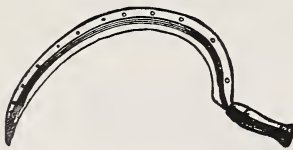


Bush Scythe. High-grade steel blade. Painted red. 18-in. \$1.50 each; 20-in. \$2 each.



Bush Hook. Forged steel. 36-inch hickory handle. \$3 each.

Grass Hooks



Imported English. With heavy riveted back, thin cutting blade; easy to sharpen; forged from the best-grade steel. No. 2, 90 cts. each; No. 3, \$1 each; No. 4, \$1.15 each.

Leather Horse Boots (QUALITY KIND)



Easily attached to the horse's feet; prevent marring the lawns. Frequently after rains, or in the spring, the lawns are soft and easily cut up. Use a good leather boot and save the lawn. Quality Kind are made good.

Double-thick soles and uppers reinforced; heavy parts put together with copper rivets. Small size, \$16; medium size, \$17; large size, \$18.50 per set of four.

SCYTHE STONES, Genuine English. Round, tapering. 75 cts. each.
Genuine Carborundum. No. 190, 40 cts. each; No. 192, 50 cts. each.
Red-End. 15 cts. each, \$1.50 per doz.

SCYTHE RIFLES, Emery-coated. 25 cts. each, \$2.50 per doz.

BENDELOW PUTTING GREEN CULTIVATOR. Consists of a steel shaft on which are fastened 14 steel circular knives; these cut down into the turf, aerating it and opening it for top-dressings and seedings. Corrects a "hide-bound" condition of the turf. \$125.

WIRE STRETCHER and TACKLE BLOCK. Consists of a pair of Tackle Blocks and special eccentric wire holder. Useful for all purposes of Tackle Blocks. For stretching wire, place the hook around the post and secure the wire in the eccentrics; then pull the wire tight and secure the rope to the post—then staple. \$2.75.

BOSS STAPLE PULLER. The simplest, strongest, and most perfect Staple Puller made. Pulls the staples with one blow of the hammer and does not injure the fencing. Length, 11½ inches. Made of the best cast steel; light and strong. 75 cts.

The "K" Hand-Power Stump Puller

By means of this device land may be cleared of stumps economically and quickly. The device is made from the finest steel and has two speeds, a high for light pulling and a low for heavy pulling; the equipment also comprises pulley-blocks, cable, etc. Offer No. 1. Puller, blocks, grab, 200 ft. of cable of ¾ and ⅞ in. diameters. Capacity 280,000 lbs. \$330. Offer No. 3. Puller, blocks, grab, 155 ft. of cable of ¾ and ⅞ in. diameter. Capacity 280,000 lbs. \$298. Offer No. 4. Puller, blocks, 75 ft. of cable of ¾ and ⅞ in. diameter. Capacity 140,000 lbs. \$210.50.

Special Root Hook for low cut stumps; affords a hold for the cable without digging. Extra \$23.

PERFECT FRUIT-PICKER. Made of steel wire, heavily galvanized; can be attached to any pole. 60 cts. each.

POST-HOLE DIGGERS, Samson. 56 inches, \$6.

Rapid. 59 inches, ash handle, \$5.

POST-HOLE AUGER. 6-in., \$2; 8-in., \$2.25.

To eradicate earthworms use "Vermol," described on back cover



Fruit-Picker

Stump & Walter Co.'s GOLF TURF

PRICES SUBJECT TO MARKET CHANGES

Auto-Spray

Recommended for applying Bordeaux Mixture to putting-greens. Convenient, durable, efficient. Holds four gallons. Tank made of galvanized steel or brass. High-grade hose. Castings for handle, etc., all malleable. No continuous pumping as in the case of the Knapsack Sprayer, nor continuous pumping or slopping as in the case of the bucket pump. A few strokes of plunger compresses enough air to cover half a putting-green.

- Auto-Spray No. 1B. Brass Tank, with "Auto-Pop".....\$9 50
- Auto-Spray No. 1D. Galvanized Tank, with "Auto-Pop" Nozzle..... 6 50
- 2-foot Brass Extension Pipe..... 60
- Attachment for using two nozzles at one time..... 1 50
- Brass Strainer for straining solution..... 1 20
- Bordeaux Nozzles..... 1 50

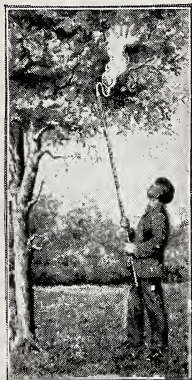


Asbestos Torch

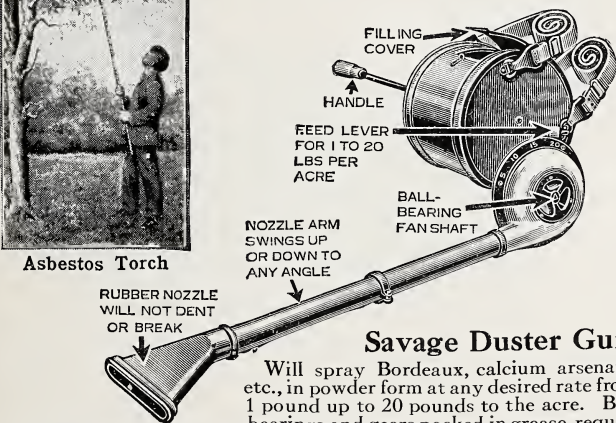
For Tent Caterpillars

Attach the Torch to the end of a pole; saturate with kerosene oil, light and hold under the caterpillars' nests, and pass quickly along the branches and around the

trunk of the tree. The heat instantly destroys the insects and will in no way injure the trees. Without pole, 60 cts.



Asbestos Torch

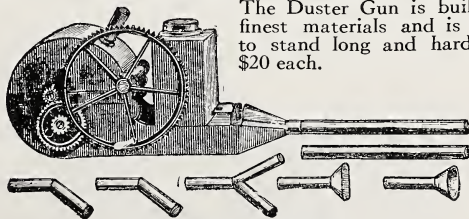


Savage Duster Gun

Will spray Bordeaux, calcium arsenate, etc., in powder form at any desired rate from 1 pound up to 20 pounds to the acre. Ball bearings and gears packed in grease, require to operate than other machines.

no lubrication, making it easier

The Duster Gun is built of the finest materials and is intended to stand long and hard service. \$20 each.



Powder Duster

For applying Dry Bordeaux Mixture, Soot, or Tobacco Dust to lawns, also Paris Green, Arsenate of Lead, etc., to potatoes and other vegetables, tobacco, cotton, etc. Made so strongly that, with average care, the machine will give efficient service for many years. Price, \$12.



Early Bird Rake

More efficient and economical than any previously on the market. It will leave the green smooth and clean. The Early Bird Rake is unqualifiedly endorsed by leading golf professionals, golf-course experts, and greenkeepers.

- We offer it in two sizes: Each
- Width, 30 in.; weight, 8 1/4 lbs..... \$10 00
- Width, 24 in.; weight, 4 1/2 lbs..... 5 00



Hay-Caps for protecting and curing hay

Hay-Caps

The Hay-caps supplied by Stump & Walter Co., as shown in the illustration, are made substantially of heavy waterproof sheeting. In order to hold the Hay-caps down, eyelets are provided in each corner to attach weights.

Size	Doz. lots	100 lots each	250 lots each	500 lots each
40 x 40 inch.....	\$12 60	\$1 00	\$0 95	\$0 90
50 x 50 inch.....	16 80	1 35	1 30	1 25
60 x 60 inch.....	21 00	1 70	1 65	1 60

Shuredry Hay-Stack Covers

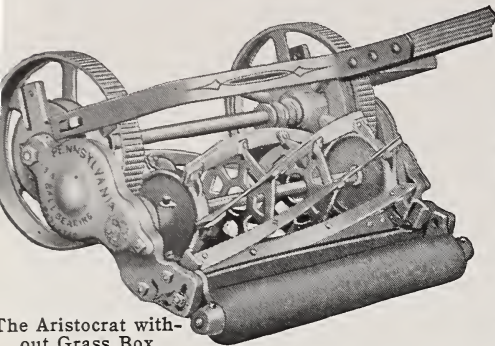
The Shuredry Hay-Stack Covers are substantially made of waterproof cloth and not affected by the weather. They will not heat, stick, or crack.

Size	Each	Each
15 x 14 feet.....	\$12 00	\$32 00
8 x 10 feet.....	15 00	60 00
10 x 10 feet.....	15 00	94 00
12 x 12 feet.....	22 00	135 00

Bamboo Spray Pole for Tall-Tree Spraying

Bamboo Spray Poles are brass-lined to resist the corroding effect caused by strong solutions. Each Spray Pole is equipped with a drip-shield at the top and brass shut-off at the bottom. Spray Poles over 12 feet are not entirely satisfactory and we do not recommend them. 8 ft. \$4.20, 9 ft. \$4.40, 10 ft. \$4.60, 12 ft. \$5.30.

Mowers for Golf Courses and Tennis Courts



The Aristocrat with-
out Grass Box

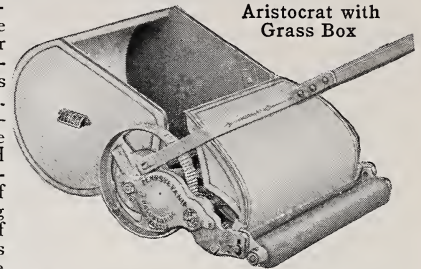
inch and left even and smooth. The Aristocrat is ball-bearing, runs easily, and does not jump when starting.

Considerable weight of the Mower is carried by the iron roller, which rolls the worm casts and assists in keeping the green true and even. Wherever the Aristocrat has been given a thorough test, it has been accepted and given the preference. The illustration with the Grass Box attached shows the Aristocrat complete, and the way it should be operated to obtain the best results.

The Aristocrat is used exclusively and highly recommended by many of the best golf, tennis and cricket clubs.

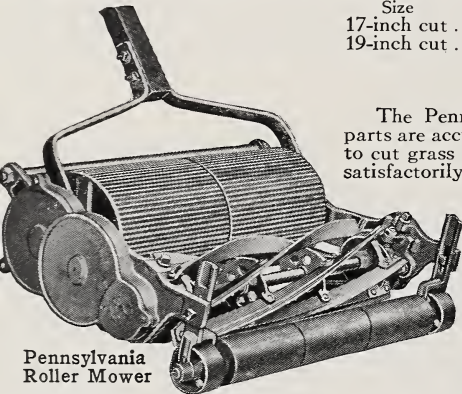
The Aristocrat Golf Mower, Ball-Bearing

The Aristocrat is the acme of putting-green Mowers. Extreme tests have proved this machine superior to all other Mowers in keeping the greens in first-class condition. The Aristocrat was specially designed for putting-greens. Consideration was exercised in the construction of this machine to give the longest service, ease of adjustment and operation, and the best possible satisfaction that can be obtained from a Golf Mower. The life of this Mower is long compared with the other styles of Golf Mowers. The seven revolving blades and the bottom knife are the best crucible tool-steel, oil-tempered and water-hardened. A double train of gears drives the revolving blades from two 9½-inch traction wheels. The greens are shaved to ⅙ of an



Aristocrat with
Grass Box

Size	Gross weight	Net weight	Price	Grass Box
17-inch cut	102 lbs.	72 lbs.	\$34 00	\$8 00
19-inch cut	104 lbs.	76 lbs.	38 00	8 00



Pennsylvania
Roller Mower

Pennsylvania Roller Mower

The Pennsylvania Roller Mower is substantially constructed of steel, malleable and cast. The parts are accurately machined, insuring an easy running and noiseless Mower. This machine is designed to cut grass on borders, terraces, and undulating greens. It will clip as close as ⅙ of an inch and cut satisfactorily where grass is not allowed to exceed 2 inches in height. This Roller Mower has six revolving blades of crucible tool steel, oil-hardened and oil-tempered.

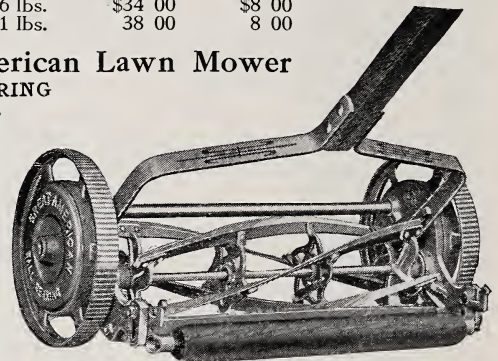
Size	Gross weight	Net weight	Price	Grass Box
16-inch cut .....	.88 lbs.	66 lbs.	\$34 00	\$8 00
18-inch cut .....	.94 lbs.	71 lbs.	38 00	8 00

Pennsylvania Great American Lawn Mower

BALL-BEARING

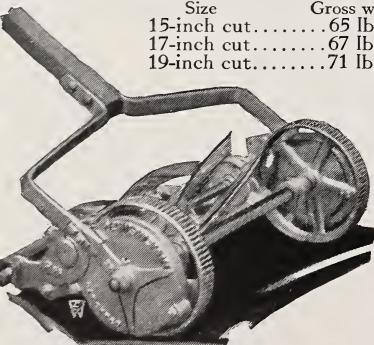
The Great American is a double-gear machine with five knives made of crucible tool steel of the very highest quality, oil-tempered, and water-hardened. Its bottom knife is of the finest quality and self-sharpening. The case-hardened tool steel cones and cups in which extra-large balls revolve in conjunction with the very high wheels (10 inches in diameter), make it one of the easiest running Lawn Mowers on the market.

The Great American, as a machine for approaches and tees, is unsurpassed in quality, durability, and the perfection of its working parts. It is a machine of the very highest class in every respect.



Great American Mower

Size	Gross weight	Net weight	Price	Grass Catcher
15-inch cut	65 lbs.	42 lbs.	\$19 50	\$4 75
17-inch cut	67 lbs.	44 lbs.	22 50	4 75
19-inch cut	71 lbs.	48 lbs.	25 00	5 25



Pennsylvania Home Golf Mower

Pennsylvania Home Golf Mower

LOW WHEEL, PLAIN BEARINGS, FOR HOME GREENS

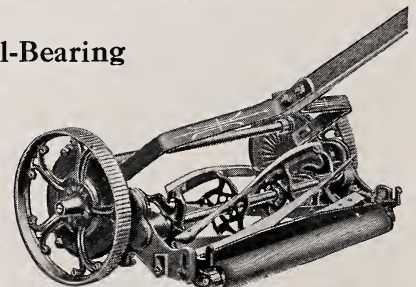
This Mower is especially adapted for small golf links, tennis courts, bowling greens, and cricket creases. Can be adjusted to cut ⅙ of an inch, practically shaving the lawn. Size, 16-inch; gross weight 67 pounds; net weight 37 pounds; price, \$25; grass box \$8.

Pennsylvania Junior Ball-Bearing

The Pennsylvania Junior has all the good features incorporated in a perfect Lawn Mower. The five revolving blades are driven by a triple set of gears and a 10-inch traction wheel from each side. The

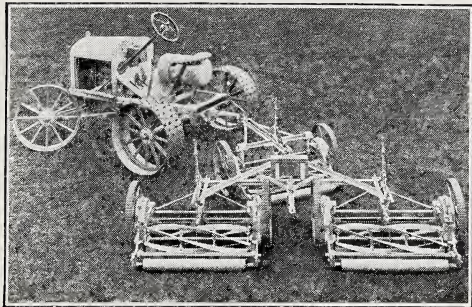
revolving blades and the bottom knife are the best crucible tool-steel, oil-tempered and water-hardened. The Pennsylvania Junior is particularly adapted for the cutting of tees and approaches.

Size	Gross weight	Net weight	Price	Grass Catcher
15-inch cut	71 lbs.	48 lbs.	\$27 00	\$4 75
17-inch cut	74 lbs.	51 lbs.	30 50	4 75
19-inch cut	77 lbs.	53 lbs.	34 50	5 25
21-inch cut	80 lbs.	55 lbs.	38 50	6 00

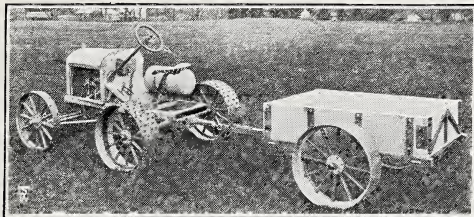


Pennsylvania Junior Ball-Bearing

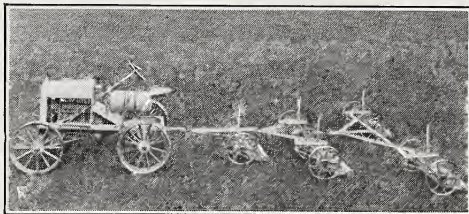
Worthington Tractor



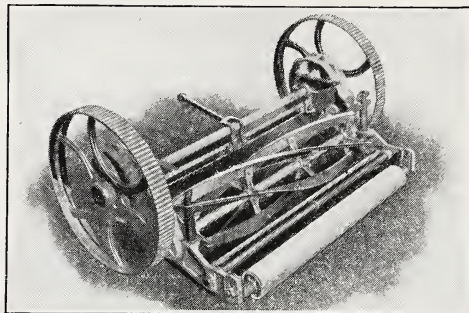
Worthington Tractor and Triple Mower turning on a radius of 7½ ft. Tractor \$550; Triple Mower \$400. The Mower may be horse-drawn if required. Shafts \$20 extra; pole \$25 extra. All prices f. o. b. factory in Pennsylvania.



Worthington Tractor and Dump Cart. Tractor \$550; Dump Cart \$125. Both f. o. b. factory in Pennsylvania.

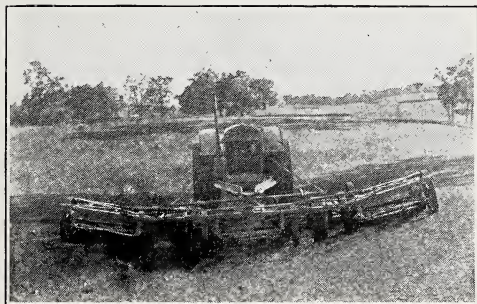


Worthington Tractor and "Convertible Quint" Mower, cutting a swath over 11 feet wide. Tractor \$550; "Convertible Quint" Mower \$675. Mower may be horse-drawn if required. Shafts \$20 extra; pole \$25 extra. All prices f. o. b. factory in Pennsylvania.

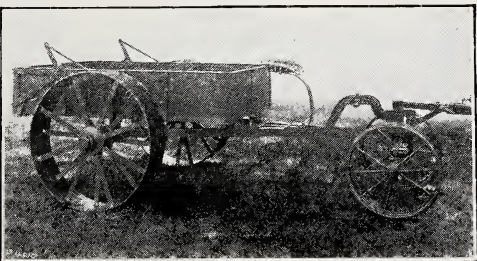


Worthington Cutter Unit. May be purchased separately for replacement. Price \$125, f. o. b. factory in Pennsylvania.

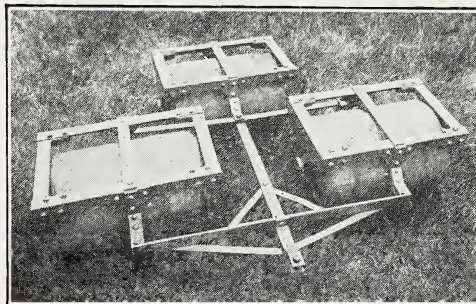
Toro Tractor



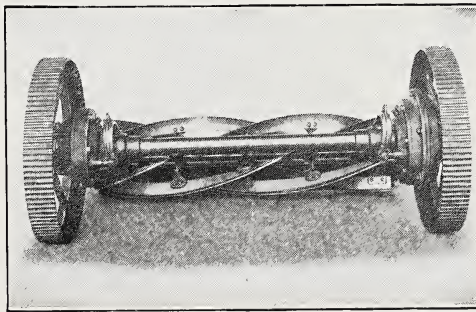
Toro Tractor and Five-Unit Mower. Tractor only, for construction and general hauling \$850. Complete outfit as shown, Tractor, Frame and Cutting Units \$1,575. With three units instead of five, complete, \$1,295. All prices f. o. b. factory in Minnesota.



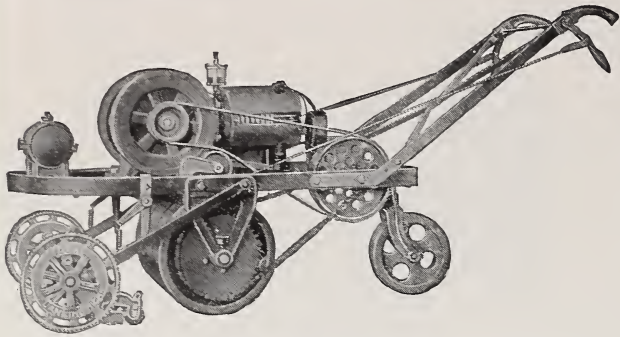
Toro Dump Cart. For transporting compost, sand, soil, etc. Price, without fore truck, \$125, f. o. b. factory in Minnesota.



Toro Flexible Roller. Three units, total weight 1,600 lbs. Price \$150. Five units, total weight 2,600 lbs., price \$250. Drums are of steel and concrete; edges rounded. Both prices f. o. b. factory in Minnesota.

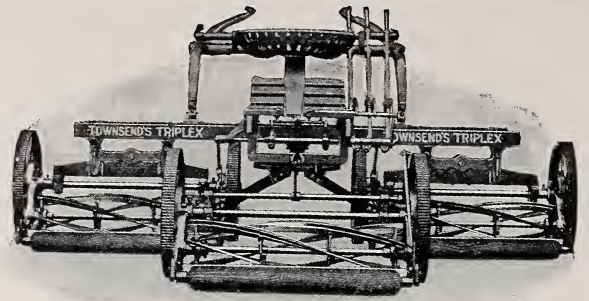


Toro Cutter Unit. May be purchased separately for replacement. Price \$115, f. o. b. factory in Minnesota.



Ideal and Ideal Junior Power Mowers

Ideal. A very practical and dependable Mower, built with as few parts as possible. Cuts a swath 30 inches wide at a speed of 2 3/4 miles per hour. Price \$385, f.o.b. New York. Sulky or riding attachment, \$30 extra. Extra Cutting Unit, \$65 each.
Ideal Junior. Similar to the above, but having only a 22-inch cutting blade. Price of "Junior" Mower, \$260. Extra 22-inch Cutting Unit \$45, f.o.b. New York.



Townsend Triplex Lawn Mower

This Triplex is much lighter than the ordinary horse lawn mower, but cuts three times as wide a swath. One man and one horse, with a Triplex, will cut more grass in a day than three men and three horses with three ordinary horse lawn mowers, thus saving the wages of two men, the cost of two horses, and the cost of their care and keep. Here is a mower that will cut a swath 86 inches wide. It floats over the uneven ground as a ship rides the waves. One mower may be climbing a knoll, a second may be skimming the level, and a third may be paring a hollow. Price, \$375, f.o.b. factory. Weight 600 pounds. Extra Unit, \$100, f.o.b. factory.

The Four-Acre Power Lawn Mower

The motor has a 2 1/2-in. bore with 2 1/2-in. stroke, and runs at 3 1/2 miles per hour at 1,000 revolutions per minute. Cuts 4 to 5 acres a day on a consumption of one gallon of gasoline. Width of cut 24 ins. Price \$265 f.o.b. New York. Grass box \$5 extra.



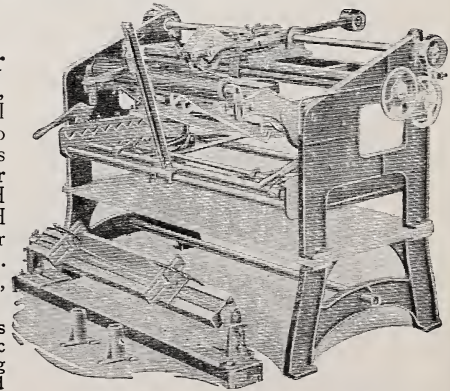
Four-Acre Mower

FOUR-ACRE ROLLER MOWER

A gasoline machine recommended by the manufacturers for use on putting-greens. Design similar to the above, but with roller drive and a closer cutting unit. Price \$325 f.o.b. New York.

Peerless Horse Mower Grinder

A machine that has been built for use with power (1/2 horse-power), designed to sharpen tractor, horse, and pony mowers, as well as hand mowers. Will grind spiral reel knives up to 40 inches. Shipping weight 500 lbs. Price, \$250, f.o.b., Plymouth, Ohio.

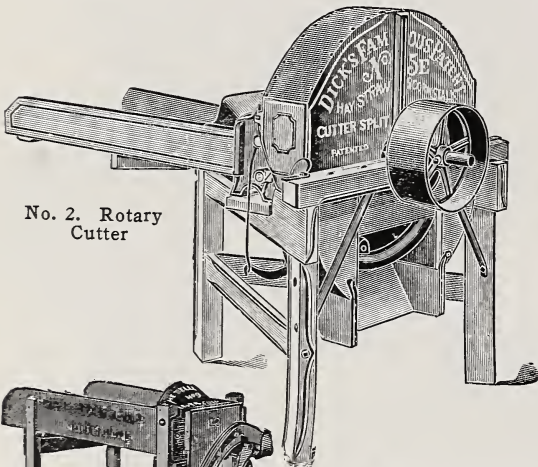


Peerless Horse Mower Grinder

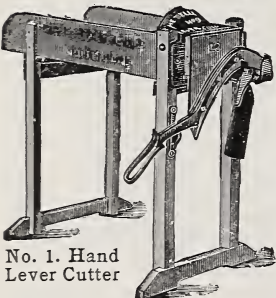
Ideal Lawn Mower Grinder

A smaller machine, though equally well made. Designed to sharpen hand mowers with 24-inch blades or less. May be ordered either to work by hand or with connections for power (1/2 horse-power). Price, \$100, f.o.b., Plymouth, Ohio.

NOTE.—Above prices do not include electric motor. Skate sharpening attachment furnished with both machines.



No. 2. Rotary Cutter



No. 1. Hand Lever Cutter

Bent Cutters

For severing stolons of Creeping Bent into 1 1/2-inch lengths. We offer two sizes, as follows:

No. 1. Hand Lever Cutter. Recommended where but one green is to be vegetated and for occasional repairs. \$10.

No. 2. Rotary Cutter. For either hand or power. A hand-crank is

furnished, or you may belt it to an engine or to your tractor. Recommended where several greens are to be vegetated. \$87.50.

Iron Signs

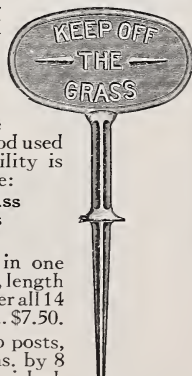
These are cheaper than painted signs, and are good appearing. They are galvanized by a method used for marine hardware, where maximum durability is required. The following letterings are available:

Replace Divots
Out of Bounds
Under Repair—Keep Off

Keep off the Grass
Private Grounds



No. 2



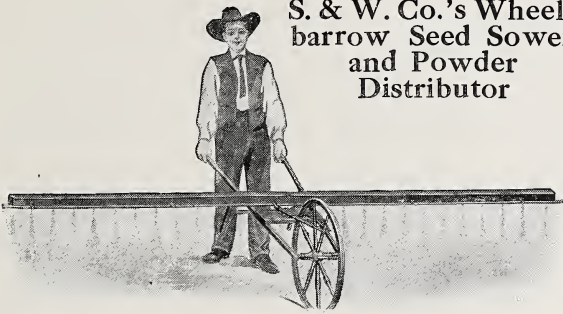
No. 1

No. 1. With shank cast in one piece; plate 7 ins. by 4 ins., length of shank 10 ins., length over all 14 ins., weight 2 lbs. Per doz. \$7.50.

No. 2. To be attached to posts, fences or trees. Size 4 ins. by 8 ins. Necessary screws furnished. Per doz. \$5.50.

Stump & Walter Co.'s GOLF TURF

S. & W. Co.'s Wheelbarrow Seed Sower and Powder Distributor



We recommend this practical machine for sowing all grass mixtures. It is provided with a double hopper, 14 feet in length and well balanced. One side of this seed hopper is adapted for all heavy seeds, such as timothy, clover, alfalfa, millet, etc. The opposite side sows lighter, smaller seeds, such as Fairway Mixture, red-top, blue grass, bent grass, orchard grass, etc. The machine is simple to operate. A boy can work it. The operator can easily regulate the machine to sow any desired quantity to the acre. It does not clog and will sow evenly an area 14 feet wide. Full directions are in each hopper. Weight, 45 lbs. \$17 each. Special hopper to enable this machine to distribute Bordeaux or fertilizers, \$11. Complete machine, both as seeder and powder distributor, \$27.

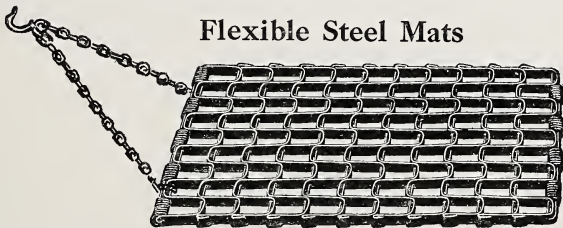


"Golf Special" Grass Seeders and Sowers

These have large-capacity hoppers, placed close to the ground. Hoppers are 10 feet long and are furnished either for seeds, dry powders, or Vermol Worm Eradicator.

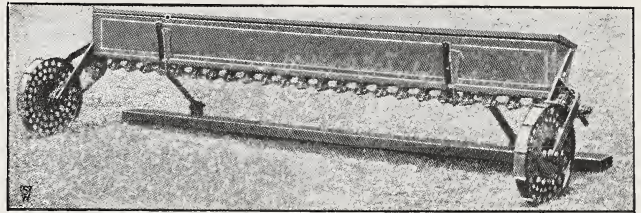
- No. 1. For sowing grass seeds.....\$22 50
 - No. 2. For sowing dry powders..... 21 00
 - No. 3. For sowing Vermol Worm Eradicator..... 19 75
- Shipping weight, 60 lbs.

Flexible Steel Mats



For distributing evenly top-dressings on putting-greens. We offer in three sizes:

- No. 1. 24 x 42 ins.....\$6 00
- No. 2. 36 x 54 ins..... 11 25
- No. 3. 40 x 72 ins..... 15 00



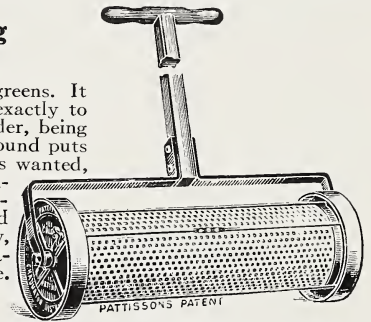
Peoria Grass Seeder

This machine sows grass seeds more uniformly than by any other method. It has a force feed, adjustable to any desired rate of seeding per acre. A tractor hitch is furnished, and a tooth-harrow or brush-harrow may be attached at the rear, the combination of tractor, seeder and harrow being the most efficient for seeding fairways. The machine sows close to the ground, and there is no wastage of seed from wind.

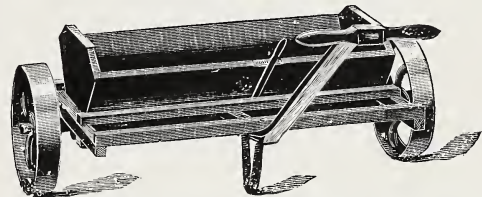
- No. 1. Sows a width of 12 feet.....\$55 00
- No. 2. Sows a width of 16 feet..... 65 00

Top-Dressing Distributor

For top-dressing putting-greens. It graduates the distribution exactly to requirements and the cylinder, being within 1½ inches of the ground puts the dressing just where it is wanted, even in windy weather. Consists of two perforated cylinders, the outer one actuated by a regulating thumb-screw, regulating the flow of material. English manufacture. Price, \$45.



S. & W. Co.'s Hand Fertilizer Sower for Top-Dressing Lawns



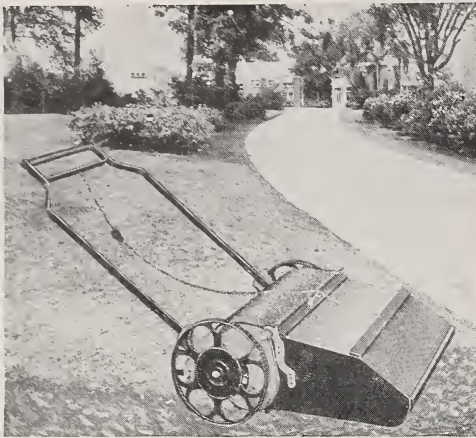
Has the same adjustment as a more expensive horse-power machine and will sow all commercial fertilizers. The hopper is 34 inches long and holds one and one-half bushels. Besides top-dressing greens, lawns, etc., it is a handy machine for all kinds of garden and field work. When two blades are removed, it will sow damp sand. Also is an excellent machine in the winter for covering icy roads and walks with sawdust, sand, etc. Shipping weight, 83 lbs. \$27 each.

Top Not Tee

Made of annealed spiral wire with wood top, stained bright red. Push the wire into the ground to the height that suits you. Saves dirt on the hands and paint on the balls. The Tip Top Tee ensures uniform driving and improves your game.

One dozen in box, 25 cts. Mailed free.





Stump & Walter Co.'s Lawn and Golf Sweeper

Is equipped with Palmetto Brushes of the toughest fiber and unaffected by water. Sweeps and gathers fresh-cut and dead grass, leaves, stones, and other litter. Reduces labor from hours to minutes. Beautifies the grass. A real necessity for the quick and economical sweeping of lawns and golf-courses. Labor-saving, efficient, and durable machine. This new Sweeper is practically an all-year-round machine, for wherever there is a plane surface to be swept, whether sidewalk or porch, the S. & W. Co.'s Lawn and Golf Sweeper will do the work easier and quicker.

Width, 28 inches. Net weight, 84 lbs.; gross weight, 106 lbs. Price \$35, Extra Wheels without Rubber Tires \$5 each. Brush Reel, 28-inch complete with brushes \$13. Grass-Box, 28-inch size, \$10.

Pennsylvania Putting-Greens Lawn Sweeper

The PENNSYLVANIA Lawn Cleaner and Rake is quickly converted into an efficient Sweeper for removing worm-casts from putting greens without injury to the turf and in a tenth of the time consumed by usual methods. The three steel rakes are removed and the brushes substituted. The brushes are made of high-grade fiber, set in a hardwood head, and give long wear. Moisture will not injure the brushes, and owing to the construction of the machine, they are easily removed for cleaning or for interchanging with the raking cylinder. The machine is not taken apart during this operation. 24-inch sweep, \$30; 36-inch sweep, \$42.50. Brushes, per set of 3, 24-inch, \$7; 36-inch, \$9.

RUBBER HOSE



S. & W. Co.'s Special Brand (Wayahead). Surpasses all the cheaper grades of Hose. Its durability is not excelled by higher-priced Hose. It is three-ply, seamless, and non-kinkable. Standard lengths, 3/4-inch bore, 25 ft., \$4.50; 50 ft., \$8.50.

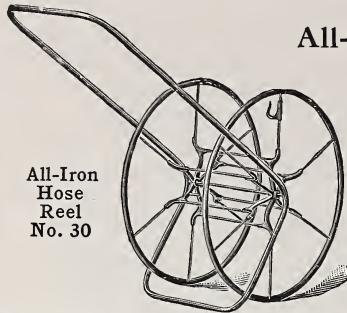


Electric. Three-ply, non-kinkable, molded Hose. The strength and durability of this Hose place it with the very best grade of Hose manufactured.

Standard lengths, 3/4-inch bore, 25 ft., \$6.25; 50 ft., \$12.
Standard lengths, 1/2-inch bore, 25 ft., \$5.75; 50 ft., \$10.50.

Other lengths, 3/4-inch 24 cts. per ft., 1/2-inch 21 cts. per ft.

Golf-Course. Six-ply, heavy duck Hose, with exceptionally strong black tube and white cover. Especially adapted for use on golf-courses, tennis-courts, and cricket-creases. This is guaranteed for any pressure and hard work as usually found on golf-courses and private estates. Will stand up and give satisfaction under conditions where ordinary garden Hose has failed. Standard lengths, 3/4-inch bore, 25 ft. \$6; 50 ft. \$11.50. Standard lengths, 1-inch bore, 25 ft. \$10.50; 50 ft. \$20.



All-Iron
Hose
Reel
No. 30

All-Iron Hose Reel

The All-Iron Hose Reels are constructed entirely of iron, and are indestructible. They are light in weight, frictionless, and the wheels being high, they are easily manipulated. These Reels cannot tip over when unreeling and there is no weight on the handle.

No. 10, 21-in. wheel, holds 100 feet 3/4-in. hose, \$5 each.
No. 20, 24-in. wheel, holds 150 feet 3/4-in. hose, \$5.50.

No. 30, 30-in. wheel, holds 500 feet 3/4-in. hose, \$9 each.

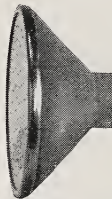
Watering Pots

We offer a special line of strongly made pots in heavy gauge galvanized iron. Note the solid spout; this, with the dome top, makes these pots the strongest made. The nose is attached firmly to the spout with a screw joint, and the cap is removable to permit of cleaning. These compete in price with the cheaper pots now on the market. 6 qt. \$1.15; 10 qt. \$1.60; 16 qt. \$2.20.

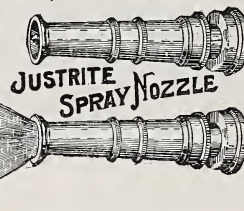


HOSE NOZZLES

S. & W. Co.'s Sprinkler Nozzle. Delivers a fine rain, yet applies plenty of water. For hand watering is superior to placing the thumb over the hose pipe, and is ideal for applying ammonium sulphate or Semesan in solution through the hose-line with the help of a Kinney Pump as offered on page 55. The S. & W. Co.'s Sprinkler Nozzle is strongly made of heavy brass and is 4 in. in diameter. Each, \$1.20, doz. \$13.20.



Magic. Brass Hose Nozzle, 3/4-inch. Has a shut-off, a stream, and a rose spray. Without rose, \$1.20; with rose, \$1.60.

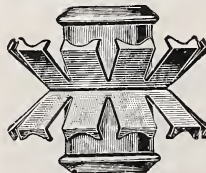


Justrite Spray. A very popular adjustable Nozzle. It gives a copious spray or a well-defined full stream. Has a positive shut-off, by turning the barrel of the nozzle. The Justrite Spray is well made of heavy brass. 90 cts.

Hose Couplings

Lightning. 3/4-inch, 50 cts. each.

Regular. 1/2-inch, 25 cts.; 3/4-inch, 30 cts. each.



Perfect Clincher Mender

Hose Menders

Cooper's Brass. 1/2 and 3/4-inch, 12 cts. each, \$1.20 per doz.; 1-in. 15 cts. each, \$1.70 per doz.

Perfect Clincher. 1/2 or 3/4-inch, 15 cts. each, \$1.50 per doz.

Sykes Hose Holder

A simple and inexpensive device for holding the hose. With this the nozzle can be placed at almost any angle. 35 cts.



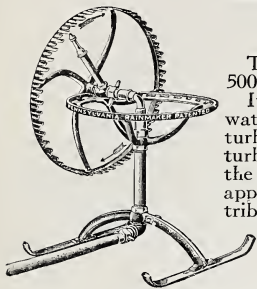
Siamese Attachment

This brass hose attachment is an excellent arrangement for operating two or more lawn sprinklers at one time. Can be attached to hose and sprinklers very easily. 3/4-inch, \$1.25 each.

LAWN SPRINKLERS

PRICES SUBJECT TO MARKET CHANGES

Rainmaker



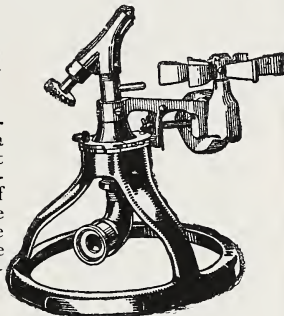
This Sprinkler waters an area of 300 to 500 square yards with drops of spray. It is made on the turbine principle. The water coming from the nozzle strikes the turbine paddles, turning the wheel. As the turbine wheel revolves it travels around the circular base, carrying the jet around approximately eight times a minute. It distributes the water evenly over the entire area so gradually that it allows it to sink into the ground and not run off into low places.

With a pressure of 30 pounds it will cover a circle 30 feet in diameter, using

100 gallons of water per hour. At 40 pounds pressure it will cover a circle 50 feet in diameter, using 215 gallons of water per hour. \$25 each; 3 for \$23.75 each.

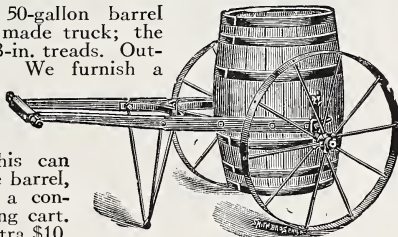
The Dayton Rotary and Oscillating Sprinkler

The Dayton is most practical, durable, and efficient. It sprinkles in a circle. It sprinkles in a half-circle. It sprinkles from a 3-foot radius to a 40-foot radius. It sprinkles every inch of ground. It operates on any pressure from 15 pounds up. The nozzle can be adjusted to any kind of a stream. Made of the best brass, aluminum, and German silver. \$8.



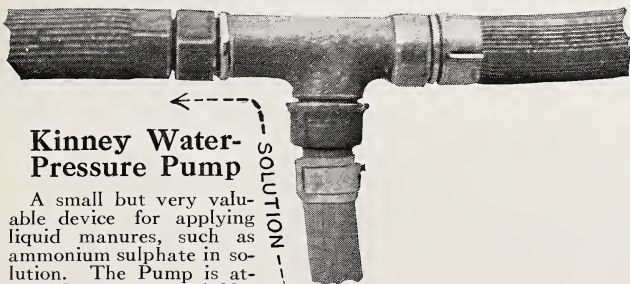
Truck and Water Barrel Combination

This consists of a 50-gallon barrel mounted on a strongly made truck; the wheels are of steel with 3-in. treads. Outfit, as illustrated, \$25. We furnish a sprinkler attachment, by means of which liquid manures and various chemicals may be watered on to turf; this can easily be attached to the barrel, turning the outfit into a convenient 50-gallon watering cart. Sprinkler attachment, extra \$10.



We also supply a hand-power high-pressure Spray Pump to be attached to barrel, producing a mist-like spray, with sufficient rubber hose to enable any part of an average green to be sprayed from the side, \$25. The cost of the combination complete is \$60, providing an equipment which will water small areas, apply liquid worm-killer in quantity, or solutions of Bordeaux and Semesan in a fine cloud.

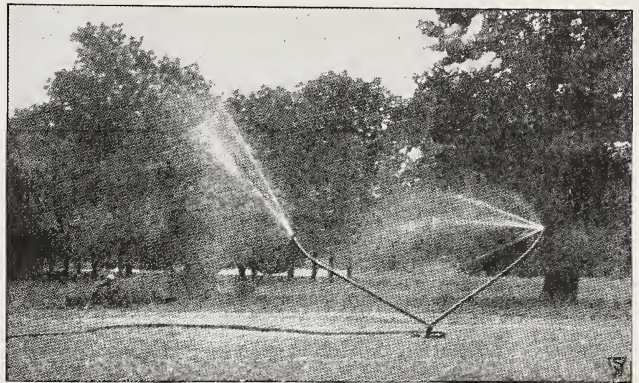
←-----WATER SUPPLY-----



Kinney Water-Pressure Pump

A small but very valuable device for applying liquid manures, such as ammonium sulphate in solution. The Pump is attached to the sprinkler hose, a second tube is dropped into a barrel containing the fertilizer solution, which may be prepared at double the strength usually used. A third section of hose is attached to the outlet of the Pump; this is the discharge pipe. On opening the faucet the water-pressure does the pumping and dilutes the liquid manure approximately one-half. Solid brass, \$3 each.

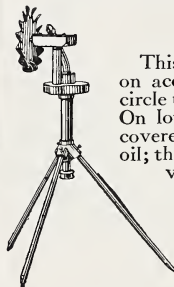
Majestic Revolving Sprinkler



Majestic Revolving Sprinkler

The long-arm Majestic gives a fine spray. It is a slow-moving machine, and the water is warmed by the air before reaching the ground. Also, there being an appreciable period between each shower, the soil has time to absorb it before the next shower. The Majestic is driven direct from turbine blades at the base, without intermediate gearing; wear is thus reduced to a minimum. Will water an area of 1,000 square yards. Large size, 5-ft. arms, \$25; medium size, 3½-ft. arms, \$20; small size, 2½-ft. arms \$16.50.

Double Rotary Sprinkler



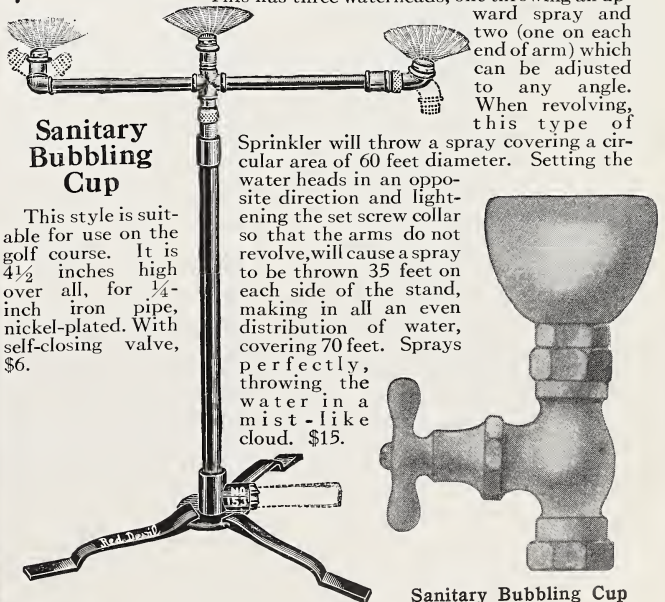
This Sprinkler has many friends among greenkeepers on account of the efficient manner in which it sprays a circle up to 50 feet in diameter where the pressure is good. On low-pressure lines, too, it works well, but the area covered is smaller. The gears are enclosed and run in oil; they are simple and rarely need adjusting, even after very long wear. \$12.50 each.

Red Devil Classic Sprinkler

This has three waterheads, one throwing an upward spray and two (one on each end of arm) which can be adjusted to any angle. When revolving, this type of

Sanitary Bubbling Cup

This style is suitable for use on the golf course. It is 4½ inches high over all, for 1/4-inch iron pipe, nickel-plated. With self-closing valve, \$6.

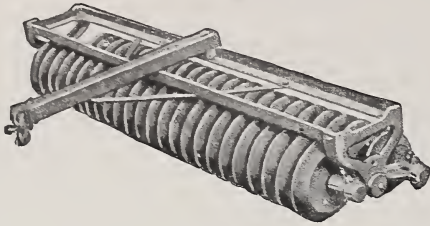


Sprinkler will throw a spray covering a circular area of 60 feet diameter. Setting the water heads in an opposite direction and lightening the set screw collar so that the arms do not revolve, will cause a spray to be thrown 35 feet on each side of the stand, making in all an even distribution of water, covering 70 feet. Sprays perfectly, throwing the water in a mist-like cloud. \$15.

Sanitary Bubbling Cup

Cultipacker and Rollers

PRICES SUBJECT TO MARKET CHANGES



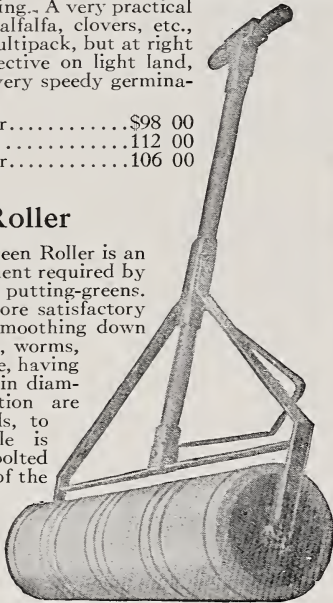
Cultipacker

This implement will break up clods and at the same time firm the soil; it is of great value in reducing to a good tilth soils which do not respond to the harrow after plowing. A very practical method of sowing grass seeds, alfalfa, clovers, etc., is to cultipack, sow, and again cultipack, but at right angles. This is particularly effective on light land, the rolling effect resulting in a very speedy germination.

- 8 ft. wide, equipped for tractor.....\$98 00
- 8 ft. wide, equipped for horse.....112 00
- 9 ft. wide, equipped for tractor.....106 00

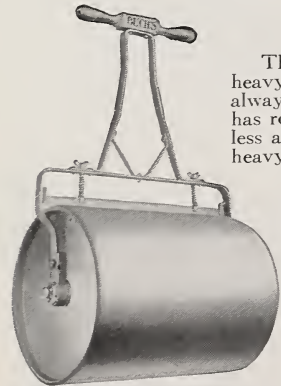
Putting-Green Roller

The S. & W. Co.'s Putting-Green Roller is an indispensable part of the equipment required by golf clubs in maintaining perfect putting-greens. This Roller being of wood is more satisfactory for gathering worm-casts and smoothing down all uneven spots caused by frost, worms, ants, etc. The roller is 4 feet wide, having four 12-inch sections, 10 inches in diameter. The ends of each section are banded with 2-inch steel bands, to prevent splitting. The handle is reinforced with steel braces, bolted to solid cast heads on both ends of the roller. The S. & W. Co.'s Putting-Green Roller is endorsed by many of the best golf clubs of America. The net and shipping weight is 186 lbs., \$22.50 each.



Iron Putting-Green Rollers

Sections are 12 inches in length, 10 inches diameter. Similar in every respect to the above, but made up in cast iron. Each \$30.



Fill it with Water or Sand

Stump & Walter Co.'s "Water-Ballast" Lawn Roller

The Stump & Walter Co.'s Water-Ballast Roller is a most satisfactory Roller. The construction consists of three heavy steel plates, pressed together and electric-welded, forming one solid steel drum with no leaky joints; handles are always off the ground as shown in the illustration. A scraper keeps the Roller clean. It is easy to pull. The drum has rounded edges to avoid tearing the turf. The Roller is filled with either water or sand, and by using more or less a weight is obtained which is most suitable for the conditions—light for moist lawns, medium for dry lawns, heavy for paths. The weight of each Roller empty and filled is given with the diameter and length below.

No.	Diam. in.	Length in.	Sections	Weight empty lbs.	Filled with water lbs.	Price
601	14	20	1	70	175	\$17 00
602	18	24	1	85	265	20 00
603	24	24	1	110	420	23 00
604	24	32	1	130	565	26 00

Cast-Iron Hand Lawn Roller

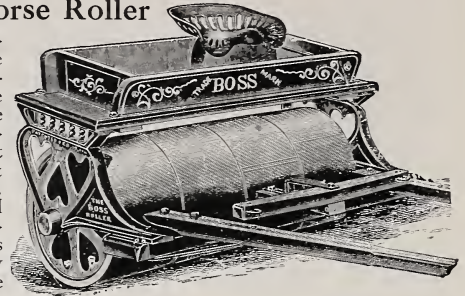
Made in one, two, and three sections. The face of each Roller is made smooth, with outer edges rounded to avoid cutting the lawn or garden. Roller-bearing, outside counter-balancing weights to keep the handles in an upright position. The Rollers of two or more sections are preferable, as they will not injure the grass when turning. The best one-man Rollers are those averaging from 250 lbs. to 500 lbs.

No.	Sections	Diam. in.	Length in.	Weight lbs.	Price
1	2	15	15	150	\$14 50
2	3	15	22	200	19 00
4	2	20	20	250	25 50
7	2	20	24	300	28 00

No.	Sections	Diam. in.	Length in.	Weight lbs.	Price
8	3	20	30	350	\$33 50
9	2	24	20	400	39 50
10	2	24	24	450	42 00
13	2	28	24	500	48 00

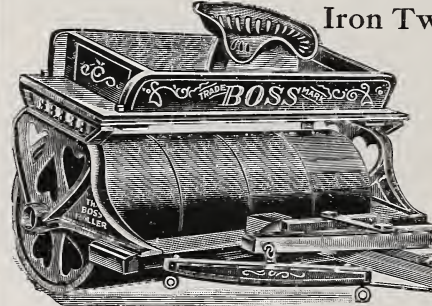
Iron One-Horse Roller

This machine is designed to meet the demand for a one-horse Roller. The construction is the same as the two-horse Roller, except that it has the shaft in place of the pole. Each section is turned smooth on the surface with outer edges beveled. Quality and finish are the same as of the two-horse Roller and also include the weight box, seat, and shaft. They give long and excellent service.



No.	Diameter	Length	Sections	Weight	Price
60	20 in.	48 in.	4	950 lbs.	\$90 00
61	20 in.	60 in.	5	1,150 lbs.	106 00
62	24 in.	48 in.	4	1,200 lbs.	114 00
63	24 in.	60 in.	5	1,450 lbs.	133 50
65	28 in.	48 in.	4	1,350 lbs.	127 50

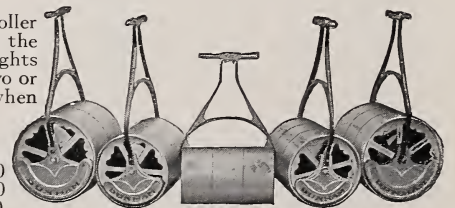
Iron Two-Horse Roller



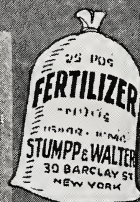
Suitable for roads, lawns, and golf-courses. This Two-Horse Iron Roller is manufactured to do heavy work. Has been used with excellent success on golf-courses and private estates, on roads, lawns, and putting-greens. This is the best draft Roller on the market. It has strong, plain bearings, pulls directly from the axle, and is so perfectly balanced that there is no weight on the team. It is equipped with a substantial weight box for additional weight, seat, and pole. Each section is turned smooth on the surface with outer edges beveled. This Two-Horse Roller is superior in quality, construction, and finish.

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No.	Diameter	Length	Sections	Weight	Price
71	20 in.	72 in.	6	1,300 lbs.	\$117 00
72	24 in.	60 in.	5	1,450 lbs.	133 50
73	24 in.	72 in.	6	1,700 lbs.	153 00
75	28 in.	60 in.	5	1,650 lbs.	151 50
76	28 in.	72 in.	6	1,950 lbs.	175 50



Cast-Iron Hand Lawn Rollers

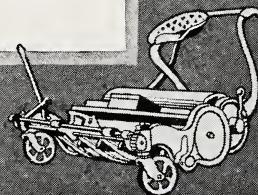
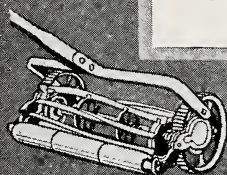


High Quality Seeds

FOR the Best Results, whether it be for the *Putting Greens* or *Fairways* on a *Golf Course*, the *Polo Field*, *Tennis Court*, or *Lawn*, the purchase of seed of the very highest quality, selecting the right varieties in proper proportions to suit soil and climatic conditions, is most important.

Remember: All our seed is of the highest quality, obtained direct from the most reliable sources of supply, and is carefully examined as to purity and growth, including tests made for us by leading seed-testing stations. We furnish, on request, the percentage of purity and growth.

We are always glad to suggest varieties of grass seeds suited to your soil and climate, to assemble combinations of seeds to your specifications, or to supply our own mixtures and tell you the exact percentage of each of the varieties in the mixture.



"Vermol" Worm Eradicator

The best of the non-poisonous class of worm-killing preparations. A powder that is harmless to animals, but remarkably effective in promptly bringing earth-worms to the surface and *killing them*. Of definite value, too, as a grass food.

**PRICE: Ton \$95, ½ton \$50, ¼ton \$27.50; three tons or over at \$90 per ton.
F. O. B. New York, Chicago, Pittsburgh, Detroit and San Francisco. Used
at the rate of ½lb. per square yard.**

When to apply "Vermol." At any time of the year when the worms are "working"; that is, when they indicate, by producing worm-casts, that they are close up under the surface of the soil. Worms are generally "working" during settled spells of warm, damp, overcast weather, and such conditions usually are suitable for applying "Vermol." They are deep in the soil, and conditions usually are unsuitable for applying "Vermol" when the weather is cold, hot, sunny, or windy.

How to find if conditions are favorable for applying "Vermol." Take approximately a pound of the powder, spread it on a piece of wormy turf measuring 1 by 2 yards and water it freely with hose or watering-can. If *many* worms come to the surface *quickly*, the conditions are right for a general application of "Vermol." If only a *few* worms appear, either the conditions are such that it is advisable to defer further experiments until another occasion, or the particular piece of turf is not so badly infested as was thought.

How much "Vermol" to use. Figure up roughly the length and width of the green, tennis-court or lawn in yards. Multiply together and divide by two: result is the correct quantity of "Vermol" in pounds for the particular job. The powder is applied at the average rate of half a pound to the square yard, and a golf green measuring 25 by 20 yards, for example, will need 250 pounds of "Vermol," and an eighteen-hole course, with greens of these dimensions, would require two to two and a half tons.

How to apply "Vermol." Having ascertained that the worms are "working," carry the proper quantity of "Vermol" to the green, spread the powder evenly, then with one or more lines of hose proceed to flood the green with water. Use *plenty*, and do not hesitate to take advantage of a high pressure.

If water is not laid on to your greens, apply "Vermol" during rain.

Worms will appear by the thousands and will quickly die. At the end of an hour the last worm will probably have come to the surface, when the green should be swept and the dead worms gathered and placed on the compost heap, where they quickly decompose.

It is a good plan to let the sprinklers run for a short while and next morning to again collect the worms: a few will have appeared during the night.

"Vermol" will not injure the grass. We have supplied it for a number of years, and it has always given complete satisfaction. It is used everywhere.

"Vermol" is perfectly safe to use—it is absolutely non-poisonous. A nine-hole golf course needs one to one and a quarter tons, an eighteen-hole course needs two to two and a half tons.

SOLE DISTRIBUTORS FOR UNITED STATES AND CANADA

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